



# City of Loveland

May 1, 2012



# Bicycle and Pedestrian Plan

# Report |

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# Chapter 1 |

## Introduction

Located along the eastern base of the Rocky Mountains, the City of Loveland enjoys a spectacular natural setting, serving as a gateway to Rocky Mountain National Park and the mountain communities to the west. Its residents enjoy a high quality of life and have expressed a desire to preserve it. The City has a diverse employment base, attracting clean, high tech industries. Other public and private amenities, including recreation and cultural facilities, as well as natural amenities such as the Big Thompson River, the Hogback areas, and many lakes make Loveland an attractive place to live.

With an estimated 2010 population of 66,859, Loveland is typical of many of the communities along the Front Range. It continues to experience above average population growth and the corresponding traffic congestion concerns. Loveland's land use plan anticipates substantial new commercial and employment development along east Eisenhower Boulevard and the I-25 corridor, both of which are actively underway. New residential development will likely be predominantly single-family in the northwestern and southeastern sectors of the City. Additional industrial development is forecast near and east of the Fort Collins-Loveland Airport and new schools will be required to serve the growing population.

These factors continue to have a dramatic effect on the present and future condition of Loveland's transportation system. Mobility plays a large role in the standard of living for residents in the community. A well-balanced, well-maintained transportation system is critical for sustaining Loveland's high quality of life. A well-balanced transportation system includes choice of travel, including walking and bicycling, in addition to automobile and transit.

The City of Loveland's Bicycle and Pedestrian Plan is a response to the City's desire for a well-balanced transportation system. The Bicycle and Pedestrian Plan analyzes the existing bicycle and pedestrian system, examines the existing and future growth within the City to identify bicycle and pedestrian destinations, incorporates public input for a preferred plan, and provides implementation strategies for prioritizing projects and implementing a successful plan. Considerable research, analysis, and public participation contributed to the preparation of the

City of Loveland's Bicycle and Pedestrian Plan. As part of this document, summary maps have been prepared to convey essential information in a concise, graphic format that is easy for the average reader to understand.

## Why We Are Doing a Bicycle and Pedestrian Plan?

Why "think biking and walking"? Nationally, there is a growing sentiment among the public, elected officials, and transportation planners to improve provisions for biking and walking as a viable form of transportation, for health/fitness benefits, and for recreation opportunities. There are a number of reasons to bike and walk. A few of them are:

### Quality of Life

Quality of life is a hard concept to define clearly. However, it is something that most individuals seek either consciously or in a less-direct fashion.

It does include the City of Loveland's western idea of an outdoor environment and provides bicycle and pedestrian facilities that are attractive and safe for people to pursue short trip travel, health, and exercise goals.

National surveys taken regarding bicycle and pedestrian mobility indicate that pedestrian connections to transit, continued development of our street system to include bicycle lanes and detached sidewalks, and reducing our sole reliance on the automobile are but a few additional bicycle and pedestrian related quality of life objectives of interest to respondents.

### Providing Choice for those that Cannot Drive

Providing a bicycle and pedestrian system is an important alternative to driving an automobile. Like all cities, the City of Loveland has a population of those that are unable to drive, whether from a disability, the inability to afford a car, age, or not wanting to drive.

Children rely on walking, bicycling, and being chauffeured to get around. Children are also at risk as bicyclists or pedestrians for a number of physical and maturity factors:

- Young children believe if they can see a driver, a driver can see them;
- They think cars can stop instantly;
- They can't tell where sounds are coming from;
- Few can judge how fast traffic is moving;
- Their field of vision is one-third that of an adult; and
- They don't recognize danger or react to it quickly enough.

The elderly are more likely to walk for trip purposes. Older adults tend to be over represented in traffic crashes and require a safe bicycle and pedestrian network.

### Latent Demand

National surveys consistently find that over 20% of respondents would consider bicycling or walking to work, shopping, and other local activities if adequate facilities were available.

### Benefits to the Individual and Family

Two major reasons why individuals choose to walk or bike are for psychological and physical health. Individuals and families can also save their financial resources through a reduction in motor vehicle use, as well as reduced chauffeuring time.

### Ideal Climate/Topography and Geographic Region

The City of Loveland is fortunate to have an ideal climate to walk and bike. The City has over 300 days of sun per year and relatively low winds. The topography is flat, making it easy to walk and bike from place to place. The City also has a density that provides for many places to walk or bike to.

### Cost of Transportation and Conservation

With the increased cost of gasoline and forecasts of gasoline exceeding \$5 a gallon, households are being financially impacted. Providing a network of bicycle and pedestrian facilities provides for a low cost alternative mode of transportation for shorter trips and conserves gasoline.

### Economic Vitality

Similar to quality of life, defining economic vitality is difficult and many different components. One measure that is often considered is how a community can retain their 25 to 45 year olds who are entrepreneurs, generating jobs and income which is spent on goods and services within the community. Based on surveys of this population group on what attracts them to their community, a good bicycle and pedestrian network is often cited.

### Purpose

The *City of Loveland's Transportation Plan* is the planning document that guides the City and development community on the orderly and planned implementation of the City's multimodal transportation system. One of the goals of the Plan is to "plan a safe, efficient, continuous, coordinated and convenient multi-modal transportation system that serves the needs of the community now and establishes the foundation for a transportation system that is sustainable for future generations." A multi-modal transportation system must incorporate bicycles and pedestrians into the planning and implementation of transportation improvement projects.

The purpose of the Bicycle and Pedestrian Plan is to identify strategies and activities that increase the use, safety, and convenience of bicycling and walking within and around the City of Loveland and to promote bicycling and walking as integral components of the region's multi-modal transportation system.

### **WHAT QUESTIONS WILL THE BICYCLE AND PEDESTRIAN PLAN ANSWER?**

IN SIMPLE TERMS, A BICYCLE AND PEDESTRIAN PLAN IS A PLAN THAT ADDRESSES A WIDE-RANGE OF BICYCLING AND PEDESTRIAN ISSUES AND QUESTIONS:

- HOW COMPLETE IS THE CURRENT BICYCLE AND PEDESTRIAN SYSTEM?
- WHERE DO BICYCLISTS AND PEDESTRIAN WANT TO GO?
- WHAT ARE THE RECOMMENDED BICYCLE AND PEDESTRIAN IMPROVEMENTS FOR THE CITY OF LOVELAND?
- HOW MANY DOLLARS SHOULD BE INVESTED IN THE BICYCLE AND PEDESTRIAN SYSTEM?
- HOW DO YOU PRIORITIZE THE LIMITED NUMBER OF DOLLARS AVAILABLE? AND
- WHAT ARE THE RECOMMENDED CHANGES TO CURRENT CODES, ORDINANCES, STANDARDS, AND POLICIES?

### **Plan Goals**

The City of Loveland's Comprehensive Plan contains extensive vision statements, goals and objectives regarding bicycle and pedestrian mobility. These statements address a wide range of important elements within the City including community design, transportation, parks and recreation, education and community health. A complete list of all of the bicycle and pedestrian related vision statements, goals and objectives is contained in the appendix of this report.

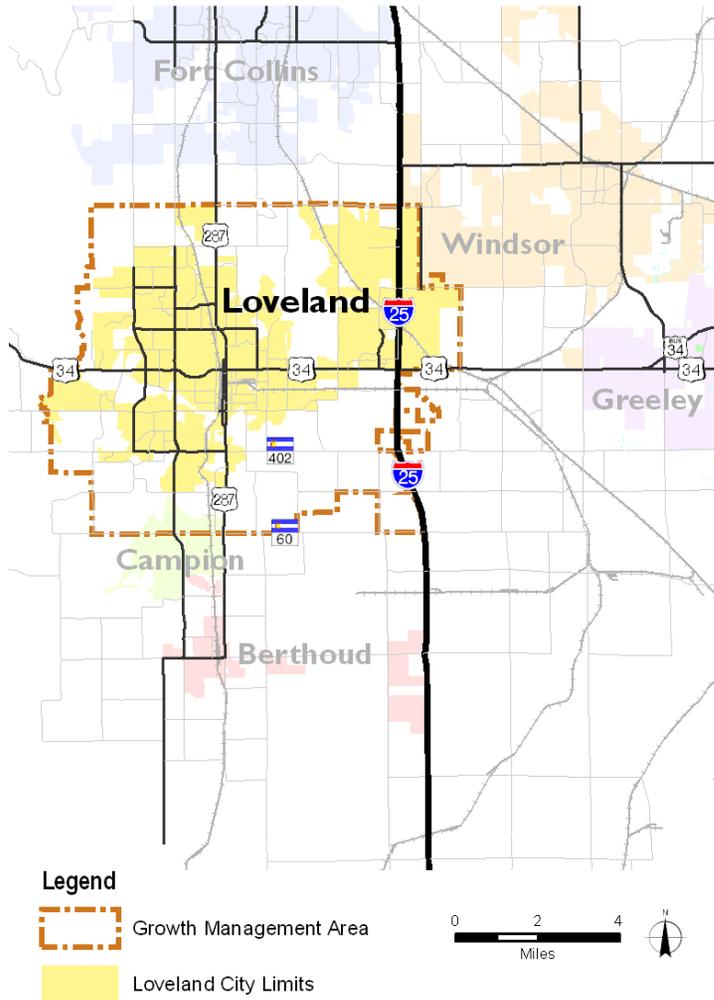
In review of these statements and input from the public, Steering Committee, and Technical Committee the following City of Loveland Bicycle and Pedestrian Plan Goals were developed as follows:

- Provide and maintain a safe and effective bicycle and pedestrian system that allows individual citizens of all ages and abilities to be able to efficiently chose to bike or walk to a variety of destinations throughout the City as a means of travel, attaining health, and quality of life.
- Fill in the missing bicycle and pedestrian segments and provide for safe intersection crossings that connects residences and places of work, shops, schools, transit, activity centers and public activities, so that people can reach destinations by walking or bicycling in addition to relying on personal vehicles.
- Design and develop a "complete streets" bicycle and pedestrian system that adheres to local, state and national codes.
- Instill bicycle and pedestrian safety, awareness and encouragement through education programs for all levels and abilities for bicyclists, pedestrians and motorists, and promote the appropriate use of traffic and code enforcement.
- Develop a sustainable and reliable source of bicycling and pedestrian funding. Provide accountability through annual bicycle and pedestrian performance reporting to determine what bicycle and pedestrian enhancements result in the greatest benefit for bicycle and pedestrian travel.

### **Plan Area**

The primary plan area is comprised of the City of Loveland's Growth Management Area and associated links to adjacent communities. As shown in Figure 1-1, these adjacent communities include the Cities of Fort Collins and Greeley, and the Towns of Windsor, Johnstown and Berthoud as well as Larimer County.

FIGURE 1-1: CITY OF LOVELAND'S GROWTH MANAGEMENT AREA



## Plan Overview

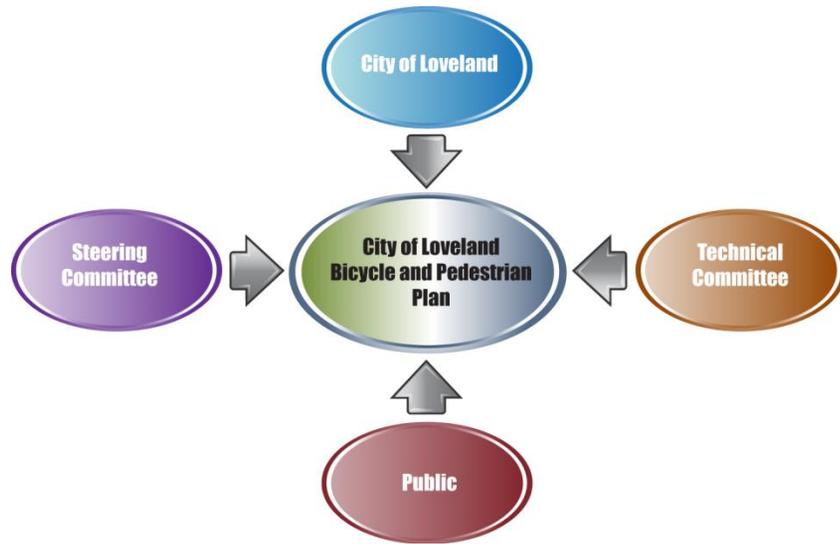
The City of Loveland Bicycle and Pedestrian Plan provides a comprehensive approach to identifying bicycle and pedestrian needs, reviewing improvements, and prioritizing implementation strategies and viable funding sources. The Bicycle and Pedestrian Plan looked for opportunities to connect and integrate existing facilities. Precise alignments may be determined during the implementation process.

The project was divided into four (4) phases:

- **Phase 1: Assessment of Existing Conditions:** This effort included mapping the existing bicycle and pedestrian system to understand where facilities are provided and where missing segments occur. In addition a crash analysis was conducted to determine where bicycle and pedestrian crashes have occurred, their severity and cause.
- **Phase 2: Needs Assessment:** This process examined primary bicycle and pedestrian destinations and identified where missing segments occurred in being able to get to those destinations.
- **Phase 3: Guidelines and Priorities:** In this phase, guidelines were developed to identify and select needed bicycle and pedestrian improvements. A prioritization process was developed to help determine how these improvements might be implemented.
- **Phase 4: Plan and Map:** In this phase, the City of Loveland Bicycle and Pedestrian Plan was developed that will be incorporated into the City of Loveland's Transportation Plan.

## Plan Framework

This plan was produced by the City of Loveland with input and guidance from a steering committee, a technical committee and through public input at workshops.



### Steering Committee

A dedicated Steering Committee was selected to provide review of data, comments, suggestions and recommendations throughout the Plan development process. The Steering Committee included representation from stakeholders involved with bicycling or walking. Their dedication in attending meetings, doing homework, and providing assistance was critically important to the development of the Plan.

The Steering Committee included members from each of the following organizations or stakeholder groups:

- Transportation Advisory Board
- Planning Commission
- Parks & Recreation Advisory Commission
- Disabilities Advisory Commission
- Senior Advisory Board
- Youth Advisory Commission
- School District
- Bike Club
- Bicycle Shop/Business
- Pedestrian Advocate
- Citizen

### Technical Committee

In addition to the Steering Committee, preparation of the City of Loveland Bicycle and Pedestrian Plan included input and review from a Technical Committee, which included a wide number of representatives from various City of Loveland departments, including Public Works, Planning, Parks & Recreation, CanDo (Coalition for Activity and Nutrition to Defeat Obesity), and the Thompson School District.

### Public Involvement

Public input was instrumental to the development of the City of Loveland Bicycle and Pedestrian Plan. Three rounds of public meetings were held over the course of the planning process for citizens to weigh in on the current operation of the existing bicycle and pedestrian system and the improvements and programs they would like to see in the future.

The following provides a brief summary of these public events and what was heard.

#### Public Event 1: Bicycle and Pedestrian Plan Kickoff

The City of Loveland Bicycle and Pedestrian Plan public kickoff event occurred on Saturday afternoon, June 26, 2010 at the Loveland Museum. The event included five activities:

1. **Open House and Bike and Pedestrian Tour Sign-Up:** The open house included the opportunity for members of the public to review a summary of the work plan and base maps of existing bicycle and pedestrian facilities within the City. Attendees were asked to respond to a questionnaire regarding their bicycling and walking experience in the City. In addition, participants could sign up for a bicycle or walking tour.
2. **Power Point Presentation of Plan Overview & Timeline:** A brief Power Point presentation summarized the Plan process, objectives and schedule. In addition, the existing bicycle and pedestrian system was presented along with some initial comments and observations regarding what makes a good bicycle and pedestrian system and areas of improvement.

## Chapter 1 | Introduction

- 3. Bike Tour Option:** A one-hour bicycle tour of the downtown area was conducted to present a wide range of bicycle facilities including problem areas.
- 4. Pedestrian Tour Option:** A separate one-hour walking tour of the downtown area was conducted to present a wide range of pedestrian treatments including variations of sidewalks, ramps or lack thereof, pedestrian signals, and missing facilities.
- 5. Discuss Tours and Public Comments:** After the tours, the public was able to share their observations and provide suggestions on areas to be addressed in the Plan.



### Kick-Off Meeting Bicycle & Pedestrian Plan



The City of Loveland's Public Works Department is starting a 12 month planning project—the Bicycle & Pedestrian Plan—that will identify where Loveland can improve conditions for bicycling and walking and identify strategies for investing in those improvements over time.

Bicycle and pedestrian facilities include sidewalks, streets, bike lanes, shoulders and shared use pathways.

The open house meeting will provide an overview and timeline of the study. Come share your feedback to help shape the City's plan for future bicycle and pedestrian facilities.

For additional information contact:  
Justin Stone 970-962-2642 [stonej@ci.loveland.co.us](mailto:stonej@ci.loveland.co.us)  
<http://www.ci.loveland.co.us/PublicWorks/PWHome.htm>

**Loveland Museum • Foote Gallery**  
**503 N. Lincoln Ave.**  
**Sat. June 26, 2010**  
**1:00 p.m.—3:00 p.m.**

## ROUND 1 SURVEY QUESTIONS WHAT'S MOST IMPORTANT TO YOU?

THE CITY OF LOVELAND BICYCLE AND PEDESTRIAN PLAN COVERS THE AREA IN AND AROUND LOVELAND. IT WILL ADDRESS PRIORITIES FOR BICYCLE AND PEDESTRIAN TRAVEL.

1. NOW THAT YOU HAVE REVIEWED THE DISPLAY BOARDS THAT OUTLINE THE SCOPE OF THE PLAN, PLEASE SHARE ANY COMMENTS YOU HAVE ABOUT THE SCOPE:
2. WHAT PURPOSE OR OBJECTIVES OF THE PLAN ARE MISSING, IF ANY?
3. FILL IN THE BLANK! I BELIEVE THAT THE 3 MOST IMPORTANT ISSUES TO ADDRESS IN THIS PLAN ARE:
4. ASK YOUR QUESTION! WHAT, IF ANY, QUESTIONS DO YOU HAVE THAT YOU WOULD LIKE TO SEE ANSWERED IN THIS PLAN?
5. PLEASE PROVIDE YOUR ZIP CODE: \_\_\_\_\_

## Chapter 1 | Introduction

### Public Event 2: Bicycle and Pedestrian Plan Alternatives

The second public event was a sketch planning workshop held on December 8, 2010 at the City of Loveland's Police Department. This event included a PowerPoint that presented elements of a good bicycle and pedestrian system, important destinations with which the bicycle and pedestrian system should connect, planning definitions, examples of different treatments, and a summary of the existing bicycle and pedestrian conditions and missing segments in the system.

Approximately 40 people attended the workshop. Attendees met in breakout tables to discuss and identify issues and potential solutions that affect bicycling or walking, and participate in a mapping exercise, where they could identify missing critical links and improvements.

At the end of the mapping exercise, each table was permitted to share their top three ideas on recommended bicycle or pedestrian plan improvements. Each map was collected and used for the development of alternatives improvements as part of the Bicycle and Pedestrian Plan.



### Public Event 3: Presentation of the Draft Bicycle and Pedestrian Plan

The third round of public meetings was held on Wednesday, April 13, 2011. This open house event provided an opportunity for over 50 people to review a summary of the boards that highlight the Plan process with maps and charts of the preferred plan. On this date, the Plan was also placed on the City's website for public review and comment.

### Public Event 4: Draft Bicycle and Pedestrian Plan Review

The fourth public meeting was held on March 15, 2012. This open house included a presentation of the plan and the opportunity for comment regarding the plan elements and priorities. This public meeting also included a presentation of the North Front Range Metropolitan Planning Organization (NFRMPO) regarding their planning process for the development of a regional bicycle plan. Attendees at the meeting were able to both comment on the City of Loveland's Bicycle and Pedestrian Plan as well as provide input to the NFRMPO regarding which regional bicycle routes into and out of the City should connect regionally to destinations such as Fort Collins, Berthoud Windsor and Johnstown.

## Plan Organization

The City of Loveland Bicycle and Pedestrian Plan is divided into four (4) chapters and support appendices. The following provides a list of the chapters and their general contents:

1. **Introduction:** This chapter provides the background, purpose, and need for the Plan.
2. **Existing Conditions:** This chapter presents the existing bicycle and sidewalk system within the City of Loveland. This chapter also identifies bicycle and pedestrian crash locations.

3. **Bicycle and Pedestrian Plan:** This chapter begins with evaluation tools and some basic best practices to be considered when developing a bicycle and pedestrian plan. This chapter also presents a map of destinations to be connected via a pedestrian and bicycle system. The financially unconstrained Bicycle and Pedestrian Plan presents the compilation of all proposed bicycle and pedestrian improvements within the City. Because this Plan does not include a dedicated source of funding, it represents a vision for the City. Planning level cost estimates were also developed for the Bicycle and Pedestrian Plan.
4. **Implementation:** This chapter presents various funding options for the Plan. Because available funding will be insufficient to complete the Plan, the chapter presents a prioritization process for selecting and implementing preferred plan elements. This chapter also presents implementation strategies and performance measures to evaluate plan implementation.

#### Appendices:

- A. **Goals and Objectives:** Appendix A provides a list of bicycle and pedestrian goals, objectives, and strategies from the City of Loveland Comprehensive Plan and other documents.
- B. **Bicycle and Pedestrian Standards and Guidelines:** Appendix B summarizes best practices in bicycling and pedestrian planning.
- C. **Proposed Improvement Cost Estimates:** List of proposed bicycle and pedestrian improvements by priority for input to the City of Loveland's Capital Improvement Program (CIP).

# Chapter 2 |

## Existing Conditions

Chapter 2 of the City of Loveland Bicycle and Pedestrian Plan consists of an inventory of existing bicycle and pedestrian facilities and a review of their missing segments. This chapter also includes a bicycle and pedestrian crash analysis to assess current safety needs.

### Existing Bicycle and Pedestrian Facilities

At the outset of this work effort, the City of Loveland created a Geographic Information System (GIS) map of the existing bicycle and pedestrian system within the City. The City used currently available data supplemented by field inventory to create the best possible map of the existing bicycle and pedestrian system within the City.

#### Bicycle



The City of Loveland's existing bicycle system is presented in Figure 2-1. The bicycle system includes recreational trails, shared use paths, bike lanes, and bike routes. These facilities are defined as follows.

In review of Figure 2-1, Existing Bicycle Facilities, a number of observations can be made, summarized as follows:

1. The system of bicycle trails, lanes and routes provides the framework for a good bicycle system to serve the City of Loveland.
2. Many existing bicycle facilities have missing segments that impact the continuity of the system and can impede bicycle mobility and travel.
3. Some bicycle facilities begin and end erratically, often associated with new development improvements adjacent to land areas that have not been developed with an unknown timeframe for completion.

4. Many of the bicycle facilities have obstacles, such as missing bike lanes along roadways with high traffic volumes or difficult to cross streets.
5. Many of the City's bicycle facilities are in need of repair and require basic maintenance such as sweeping or removing tree overhangs.
6. Bike lanes are often depositories for snow, making them unavailable to bicyclists during winter conditions.

#### BIKE ROUTES, LANES, AND PATHS - HOW ARE THEY DIFFERENT?

**Bikeway** - A general term for any street or trail which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designed with bike lanes for the exclusive use of bicycles or are to be shared with other transportation modes.

**Trails/Paths** - This is a shared use bicycle and pedestrian facility that is physically separated from motor vehicle traffic by open space or a barrier and is either within the road right-of-way or within an independent right-of-way. These are also referred to as a shared-use or multi-use paths or recreation trails.

**Bicycle Lane** - This is a bikeway on a portion of a street that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicycles.

**Bicycle Route** - A segment of a system of roadways signed for the shared use of automobiles and bicyclists without striping or pavement markings.

**Striped Shoulder** - A shoulder on rural road that provides an edge line that separates the vehicle from the bicyclist.

**Rural Road Shoulder** - A shoulder on a rural road that is at least four feet wide from edge line to pavement edge that provides a separation between the vehicle and bicyclist.

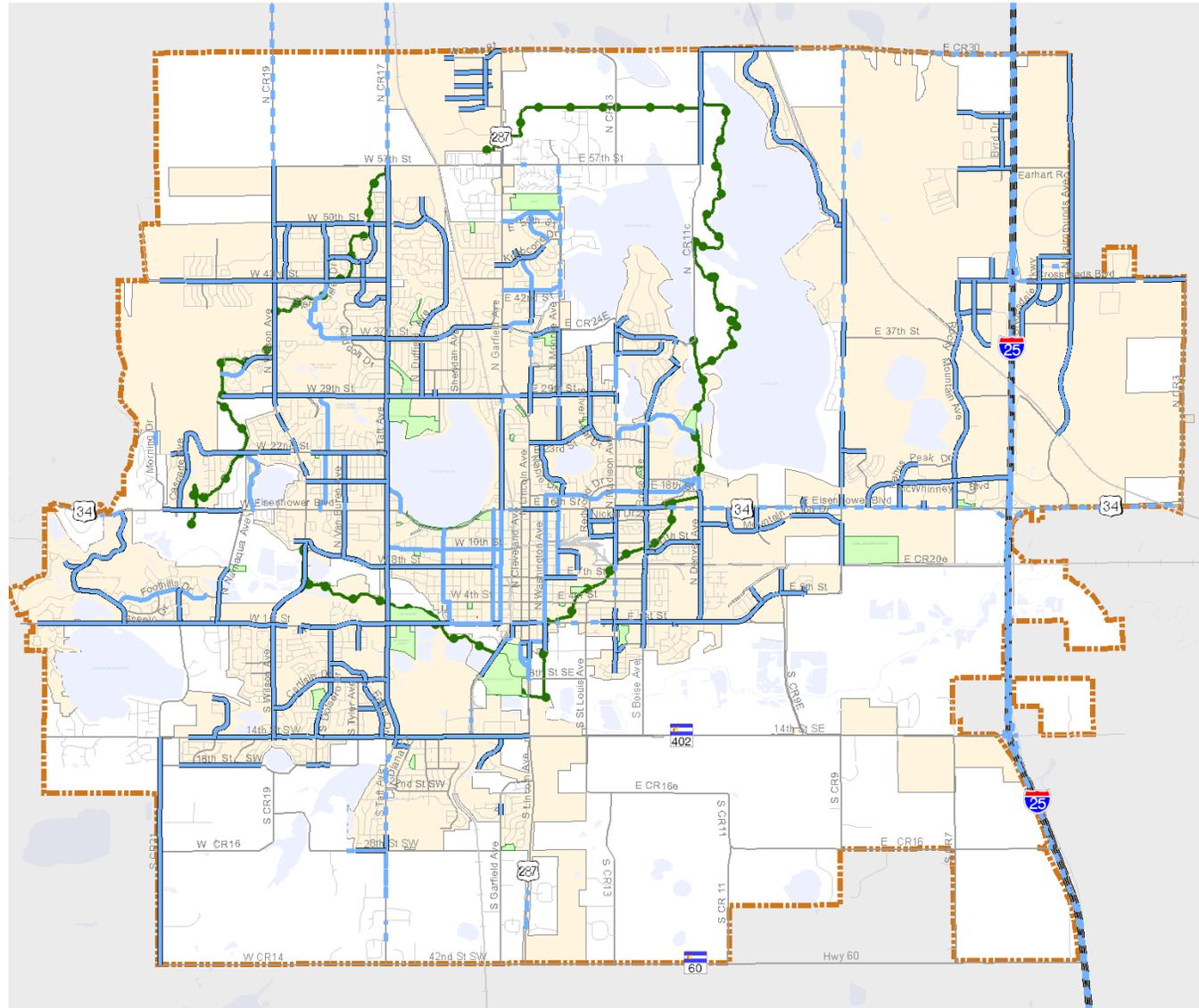
FIGURE 2-1: EXISTING BICYCLE FACILITIES

Legend

-  City Limits
-  Growth Management Area
-  Parks

Bicycle Facilities

-  Existing Bike Lanes
-  Existing Bike Routes
-  Existing Striped Shoulders (4 Ft. in Width or Greater)
-  Existing Recreation Trails



0 0.5 1 Miles



## Chapter 2 | Existing Conditions

In reviewing the bicycle system, it is also important to consider the types of bicycle travel, the experience of the bicycle rider, and the type of facilities riders may use.

In general, there are three types of bicycle travel: commuting, adult recreation, and children. The design of bikeways differs considerably for each of these purposes. Commuter bicyclists are typically advanced riders and use their bicycles as they would a motor vehicle. They want direct access to destinations with minimal detour or delay and are typically comfortable riding besides motor vehicle traffic. However, they need sufficient operating space in a bicycle lane or shoulder to eliminate the need for either themselves or a passing motor vehicle to shift position. Commuting bicyclists often want to ride the most direct route from their origin to their destination. Normally, extensive development along such routes limits the construction of detached bicycle/multi-purpose paths. However, prevalence of heavy traffic along such routes is only a minor hindrance to commuting bicyclists.

Recreational adult riders may also use their bicycles for transportation purposes (e.g., to get to the store or to visit friends), but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, recreational riders are comfortable riding on recreational trails, shared use paths, and neighborhood streets. They may also consider bicycle lanes or wide shoulder lanes on busier streets. Recreational riders may also use their bicycles for pleasure and exercise without a specific destination in mind. Such riders may prefer recreational trails along open spaces instead of traveling adjacent to or with motor vehicle traffic.

Children under 12, riding on their own or with their parents, may not travel as fast as their adult counterparts, but still require access to key destinations in their community, such as schools, convenience stores, and recreational facilities. Residential streets with low motor vehicle speeds linked with recreational trails or shared use paths are the preferred bicycle routes for children.

In review of the existing bicycle system from the perspective of the types of riders, the existing bicycle system primarily serves the experienced commuter and to a lesser extent, the children recreation riders.



### BICYCLE MOBILITY ISSUES COMMENTS FROM THE PUBLIC

- Incomplete Bicycle Network
- Commuter versus Recreational
- Types of Facilities (To lane or not to lane?)
- Bike Mobility in the Downtown
- Design Guidelines for new Facilities
- Retrofitting Older Sections of Town (Road Diet)
- Regional and Trail Connections
- Bike Racks
- Bikes on Transit
- Education
- Use of Railroad Right-of-Way (North Buchanan 28<sup>th</sup> to 37<sup>th</sup> & Connection east of I-25)

### Pedestrian



The City of Loveland's existing pedestrian facilities is presented in Figure 2-2. The pedestrian system includes the sidewalks along our streets, recreational trails, and shared use paths. The pedestrian system also includes street crossings.

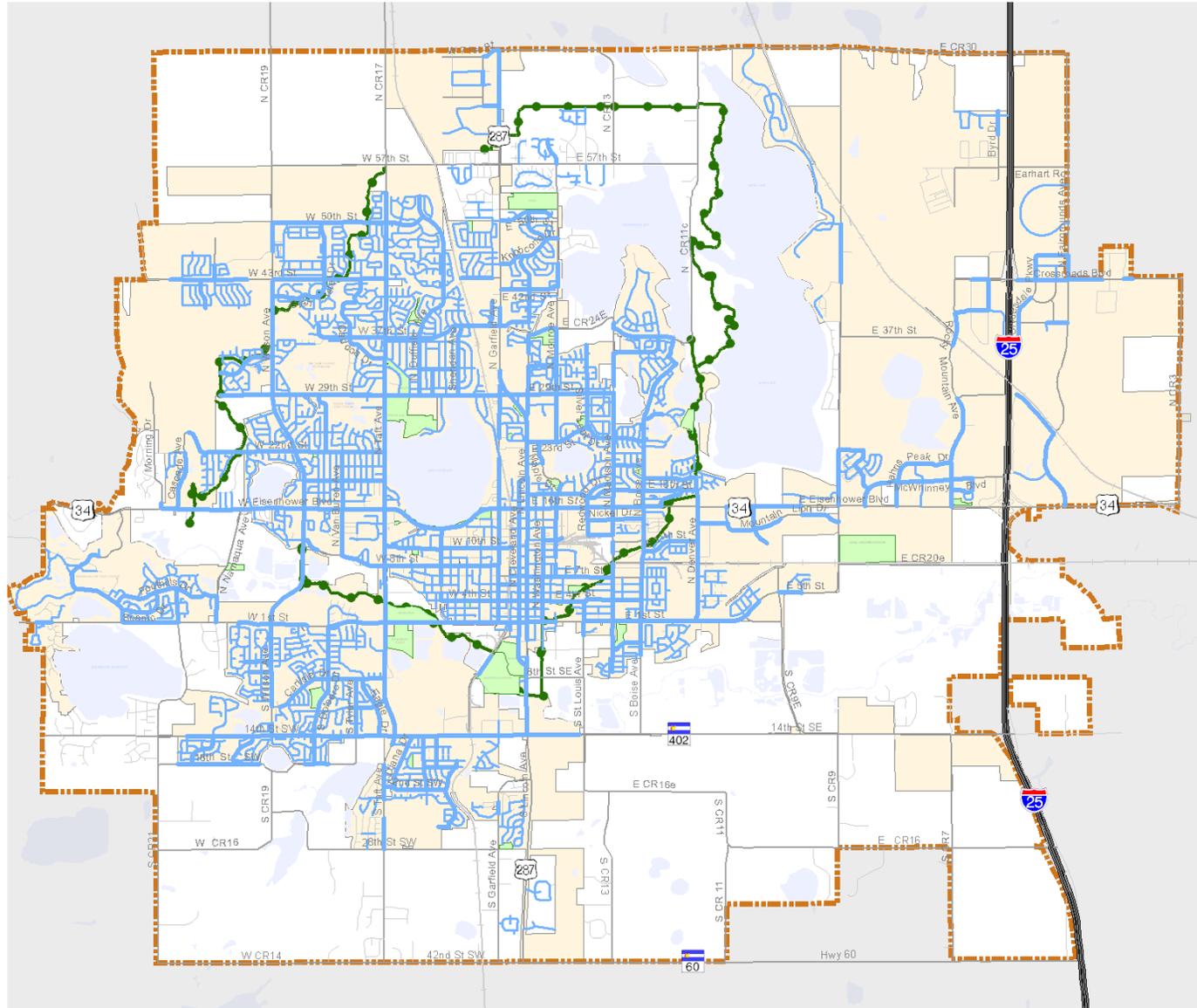
FIGURE 2-2: EXISTING PEDESTRIAN FACILITIES

Legend

-  City Limits
-  Growth Management Area
-  Parks

Pedestrian Facilities

-  Existing Sidewalks
-  Existing Recreation Trails



## Chapter 2 | Existing Conditions

The ideal pedestrian system is best described as a grid system of streets with sidewalks on both sides that provide easy and direct connections between the trip origin and destination. The ideal pedestrian system should also provide for convenient and safe street crossings and include some basic amenities, such as sidewalks separated from streets and shade from trees.

In general, the City of Loveland has good sidewalk coverage. As presented in Figure 2-2, most neighborhood streets have sidewalks along both sides, although some neighborhood streets have sidewalks along one side or no sidewalks at all.

Although most arterials also have sidewalks along both sides of the street, there are some arterials that have no sidewalks or only on one side. This lack of sidewalks requires a pedestrian to make additional street crossings in their pedestrian trip or walk in the street.

Some of these arterials are major facilities such as east Eisenhower, which supports major commercial centers that generate pedestrian trips. Eisenhower also has transit; in which both ends of a transit trip is a pedestrian trip.

Garfield north of 29th Street is another retail, service, and transit corridor that does not have sidewalks.

Along our older commercial corridors, particularly US 287 and US 34, that while there are sidewalks present, the condition and design of these sidewalks and surrounding areas does not create an environment that is conducive to people walking. Pedestrians feel exposed to the speeding traffic because the sidewalks are too narrow and they are attached to the curb.

The presence of frequent curb cuts inhibits pedestrian activity by creating more points for pedestrian and vehicle conflict and because the sidewalk is attached, the sidewalk must slope to allow for vehicle access. In many cases, there is no separation between the sidewalk and adjacent parking lots, which can lead to vehicles intruding into the pedestrian realm sidewalk area.

The general lack of trees and landscaping create an uncomfortable microclimate for pedestrians because there is no shade and the pavement creates an urban heat island effect. Also, the traffic passing at high speed creates a wind that affects pedestrians.

The ability of pedestrians to safely cross US 34 and US 287 is also an issue. The controlled crossings are infrequent and the pedestrian is exposed to multiple lanes of high speed traffic. This impedes the ability of residents in the surrounding neighborhoods to access businesses along these corridors by foot or bike.

On a positive note, it should be noted that the City of Loveland's downtown area has a very strong grid system with short blocks and sidewalks on all facilities. The narrow streets in the downtown area increase the safety of travel for the pedestrian because traffic travels slower and the pedestrian has reduced exposure to the automobile crossing a narrow street.

### PEDESTRIAN MOBILITY ISSUES COMMENTS FROM THE PUBLIC

- Missing Sidewalks
- Street Crossings
- Safety
- Access to Transit
- Maintenance
- Funding
- Physically and Visually Impaired
- Standards for New Development and Facilities
- Prioritization of Improvements
- Business Curb Cuts

## Barriers on Why We Don't Walk or Bike

In order to plan for a walkable and bikeable City, it is important to consider what factors contribute to travelers' decisions not to walk or bike to local destinations. Some decisions involve physical impediments, such as an incomplete bicycle or sidewalk system that prevent bicyclists and pedestrians from being able to complete their trips. Other decisions involve personal safety.

## Chapter 2 | Existing Conditions

Barriers to riding a bike or pedestrian activities can occur in any neighborhood in any city. Barriers can arise from oversight, budget constraints, or natural physical conditions regardless of the age, location, or layout of an area. Solutions to pedestrian barriers may include planning, design, maintenance, and altering the perceptions of pedestrians or potential pedestrians. The following are types of barriers that can contribute to a person's decision to walk or not to walk.

### Bicycle Facility and Sidewalk Conditions

The character of the bicycle facility or sidewalk to be used by a pedestrian affects his or her decision to walk to their destination. Sidewalks that are not properly planned, designed, constructed, or maintained are less likely to encourage pedestrian activity. Most bicycle and sidewalk-specific issues can be corrected with proper planning, construction, or maintenance. Poor bikeway and sidewalk conditions can be experienced in several different ways, such as:

- Uneven bike lane or sidewalk surfaces (examples include: pavement segments that are not level, heave from frost or tree roots, poorly designed driveway curb cuts, tree grates not level with the walking surface, drainage, and substandard or unmatched paving materials);
- Sidewalk pavement in poor condition;
- Sidewalks that are too narrow (precludes two or more persons walking together, or prevents wheelchair access);
- Missing segments in sidewalks or discontinuous sidewalks;
- “Curb walks” or sidewalks attached directly to the curb with no separation between the pedestrians and traffic; and
- Snow removal.

### Physical Obstacles

The landscape through which bicyclists and pedestrians must travel can affect their decision to bike or walk. Routes that cause bicyclists or pedestrians to climb steep slopes, to cross major streets or highways, or that include poor design may preclude bicycle or pedestrian usage.

### Separation of Land Use

Through zoning and other land use codes and ordinances that have evolved over the decades, zoning has separated places where one may live from locations of employment, shopping, and recreation. These zoning codes have created a land use pattern that creates and reinforces auto dependence. The movement toward mixed-use development creates an environment where mixed-uses produce and attract trips within walking distances between one another.

### Site Planning

The grid street system has been replaced with curvilinear streets and cul-de-sacs. With this change, direct connections, which are critical to the bicyclist and pedestrian have been lost and overlooked. Walls and fences around a residential neighborhood or commercial development can further exacerbate the problem by separating homes from shopping, services, and employment destinations.

### Intersections and Crosswalks

The most common setting for pedestrian/bicycle-vehicle interaction is at intersections, particularly signalized intersections. Lack of street crossings or inadequately designed intersections affect pedestrian activity. Eliminating barriers at intersections can often be achieved with design improvements.

As the number and width of lanes increases, the bicyclist and pedestrian must take more time to cross the street, resulting in greater exposure to potential danger. In addition, the number of lanes often reflects automobile traffic volumes, which increases the amount of conflicts that will occur. Barriers at intersections can be encountered in several forms such as:

- No crosswalk signals, or insufficient time to cross the street;
- No islands or medians (especially at wider or higher-volume streets);
- Uneven curbs or no curb ramps;
- Pavement treatments (decorative treatments may confuse drivers, or may deter visually impaired pedestrians);

## Chapter 2 | Existing Conditions

- Heavy turning volume that deters pedestrian crossing (especially heavy right-turn movements, that can occur on red lights); and
- Discontinuous walking route through the intersection (curb cuts that occur at different locations within an intersection).

### Personal Well-Being

Most pedestrians will avoid settings in which they feel threatened or unsafe. Real or perceived, compromising personal well-being will deter pedestrian activity. Improved design, more visible law enforcement, or educational programs might remove these types of barriers. Personal health barriers include:

- Safety (from motorists—speed and volume—bicyclists or rollerbladers, publicized history of crashes);
- Security (lighting, high crime area, excessive graffiti, emergency telephone availability);
- Health (odors, carbon monoxide levels, or exhaust inhalation on very busy streets);
- Designs not favorable for visually impaired pedestrians (no curb cuts, unfamiliar pavement treatments, lack of audible crossing signals); and
- Designs not accessible for disabled pedestrians (pavement treatments, no curb cuts, inadequate crossing time).

### Personal Preference

Barriers to pedestrian activity may be based on perceptions rather than physical obstacles. Sidewalks that are complete and well maintained will not be heavily used if interesting destinations are lacking, or if distances are perceived as too great. Some personal preference barriers can be eliminated with local planning, economic development, public awareness or educational campaigns. Some personal preference barriers include:

- Distance between origin and destination, or lack of destinations in neighborhoods;

- Amenities and ambience (visually interesting setting, occasional seating, rest rooms, trash receptacles, drinking fountains, bike parking/storage); and
- Convenience (linkages to transit or other non-motorized modes).

### Temporary Barriers

Some pedestrian barriers will disappear with time. Temporary barriers may include seasonal factors that are weather-related, or those related to construction activities. Some temporary barriers can be avoided with detours or improved planning, while others require more patience. Temporary barriers may be comprised of the following:

- Weather impacts (snow, low or encroaching branches on trees, drifts of tree leaves or snow, cold temperatures, wind exposure); and
- Construction (equipment/signs in sidewalks, eliminated sidewalks).

### Crash Analysis

One of the primary goals of the City of Loveland Bicycle and Pedestrian Plan is to provide a safe bicycle and pedestrian system to serve the city's population. To address this objective, 2005 to 2009 crash data was collected and analyzed to determine whether specific issues needed to be addressed in the Plan.

Between 2005 and 2009, 154 bicycle crashes and 110 pedestrian crashes occurred. These crashes are presented in Figure 2-3 (bicycle crashes) and Figure 2-4 (pedestrian crashes). A summary of various crash statistics is presented in Table 2-1.

A review of the bicycle and pedestrian crash maps indicates that bicycle and pedestrian crashes occur throughout the city, with many of these crashes occurring at intersections. A number of bicycle crashes also occur along streets that do not have bicycle facilities, which indicates bicycle trips are occurring even if there are no bicycle facilities to accommodate them.

## BICYCLE AND PEDESTRIAN CRASH DATA FINDINGS

### LOCATION

As would be expected, 68% of all bicycle crashes and 47% of all pedestrian crashes occur at intersections. Sight distance, intersection design, and bicycle and pedestrian features at intersections can improve intersection safety.

Approximately 24% of all pedestrian crashes were reported in parking lots, where significant backing up of vehicles occurs. Improved site design with dedicated pathways from the parking areas to the buildings can reduce vehicle and pedestrian conflicts.

Interestingly only 15% of all bicycle crashes occurred while riding a bike along the street. An equal amount, 15% occurred at driveways.

### AGE

One-half of all bicycle crashes and 40% of all pedestrian crashes occurred with children under the age of 20, most of which were between 10 and 19. Improving the bicycle and pedestrian safety programs for all, particularly teenagers will be extremely important in improving safety within the City of Loveland.

### SEVERITY

As would be expected injuries caused by a vehicle-bicycle or vehicle-pedestrian crash is extremely high, with 60% of all bicycle accidents and 90% of all pedestrian accidents having injury.

### FAULT

Approximately 43% of all vehicle and bicycle crashes are the fault of both the driver and rider. In all other crashes, the fault was 32% by the automobile driver and 25% by the bicyclist. The results are significantly different for the pedestrian crash, where 74% of all crashes are caused by the vehicle driver and 26% by the pedestrian.

### VICTIM DIRECTION

The majority of all bicycle crashes (55%) and pedestrian crashes, (85%) occur when the bicyclist or pedestrian are going straight. It should be noted, however, that 43% of all bicycle crashes occurred when the bicyclist was going the wrong-way on the street or sidewalk.

### VEHICLE DIRECTION

Not surprisingly a large percent, 41%, of the bicycle crashes occurred when the vehicle was turning right at an intersection. This situation can occur when the vehicle overtakes a bicycle and turns right in front of him when the bicycle is going straight. Left turning vehicles can find themselves in conflict with bicyclists and pedestrians in trying to turn within a gap of opposing through vehicles while not being aware of the bicyclist or pedestrian crossing the street.

### CAUSE OF CRASH

The crash database identifies a long list of causes for crashes. In the case of bicycle crashes, over 50% resulted from the driver failing to yield the right of way to the bicyclist or the driver hitting a bicyclist on a sidewalk, typically at driveway locations. Seventeen percent of bicycle crashes occurred when the bicyclist was traveling the wrong way.

In the case of pedestrian crashes, 66% of all crashes occurred because the vehicle driver failed to yield the right-of-way. Conversely, 8% of crashes occurred when the pedestrian did not yield the right-of-way.

FIGURE 2-3: BICYCLE CRASH LOCATIONS

Legend

-  City Limits
-  Growth Management Area

Roadway Designations

-  Freeway
-  Major
-  Local

Bicycle Crashes

-  Automobile Driver at Fault
-  Bicyclist at Fault
-  Both Operators at Fault

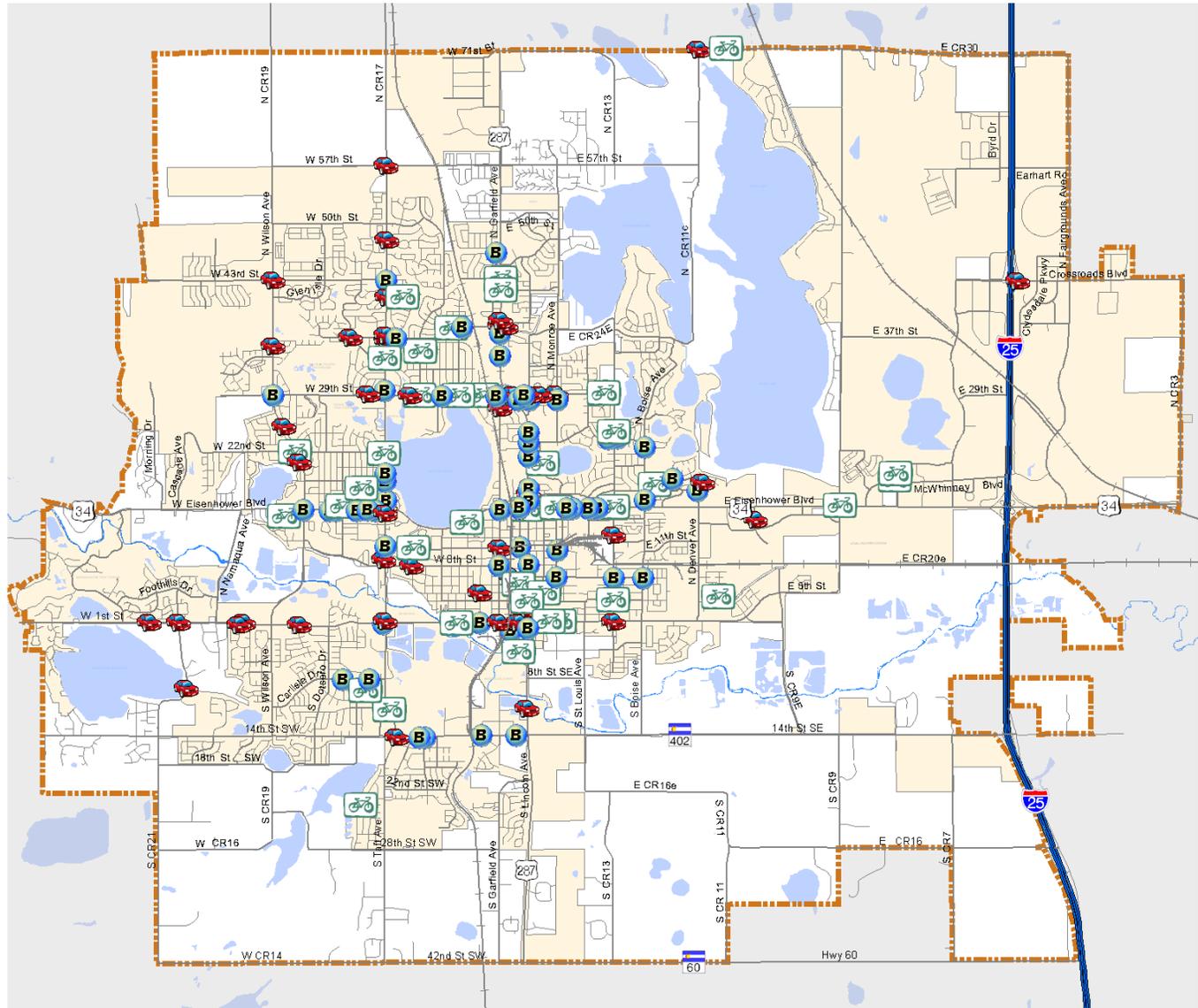


FIGURE 2-4: PEDESTRIAN CRASH LOCATIONS

Legend

-  City Limits
-  Growth Management Area

Roadway Designations

-  Freeway
-  Major
-  Local

Pedestrian Crashes

-  Automobile Driver at Fault
-  Pedestrian at Fault

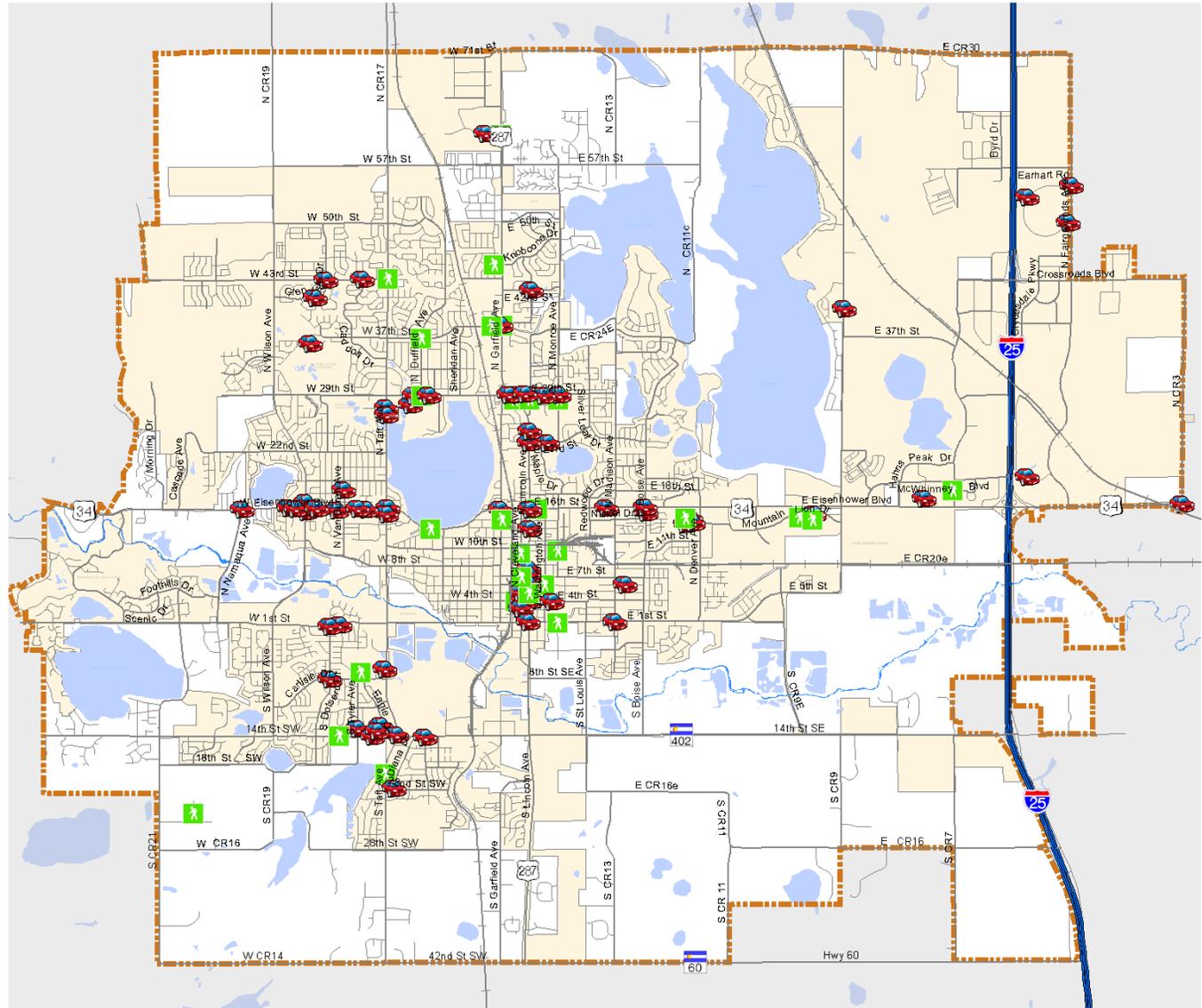


TABLE 2-1: CITY OF LOVELAND BICYCLE AND PEDESTRIAN CRASHES (2005-2009)

		Bicycle		Pedestrian				Bicycle		Pedestrian	
Location	Driveway	23	15%	8	7%	Victim Direction	Left Turn	1	1%		0%
	Intersection	105	68%	52	47%		Right Turn	1	1%		0%
	Parking Lot	1	1%	26	24%		Stopped	3	2%	16	15%
	Street	23	15%	23	21%		Straight	84	55%	93	85%
	Roundabout	2	1%	1	1%		Wrong Way	66	43%		0%
						Unknown		0%	1	1%	
Victim's Age	0-9	4	3%	5	5%	Vehicle Direction	Backing	2	1%	15	14%
	10-19	72	47%	38	35%		Left Turn	25	16%	26	24%
	20-29	19	12%	13	12%		Right turn	63	41%	15	14%
	30-39	14	9%	7	6%		Parked	5	3%		0%
	40-49	17	11%	11	10%		Straight	46	30%	54	49%
	50-59	13	8%	14	13%		Stopped	6	4%		0%
	60-69	9	6%	10	9%		Unknown	7	5%		0%
70+	2	1%	12	11%							
Unknown	4	3%		0%							
Victim's Gender	Female	30	19%	53	48%	Description	Bike Carless Riding	5	3%		0%
	Male	124	81%	57	52%		Bike/Ped Failure to Yield	16	10%	9	8%
							Bike Hits Parked Vehicle	9	6%		0%
Severity	Fatality			2	2%		Bike Lost Control	6	4%		0%
	Injury	93	60%	99	90%		Bike Sideswipes Vehicle	3	2%		0%
	No Injury	48	31%	9	8%		Driver Carless Driving	6	4%		0%
	Unknown	13	8%		0%		Driver Fails to Yield	38	25%	73	66%
							Driver Hits Bicyclist on Sidewalk	42	27%		0%
Fault	Both	66	43%		0%		Driver Hits Bicyclist Going Wrong Way	26	17%		0%
	Driver	49	32%	81	74%		Driver Sideswipes Bicyclist	3	2%		0%
	Bicyclist or Pedestrian	39	25%	29	26%		Pedestrian Crossed Against Light		0%	4	4%
							Pedestrian Failed to use Crosswalk		0%	7	6%
							Other		0%	16	15%

# Chapter 3 |

## Bicycle and Pedestrian Plan

The Bicycle and Pedestrian Plan provides the framework for a citywide bicycle and pedestrian system. The Plan reflects what is required to provide a choice in travel as modes an alternative to the automobile.

The Bicycle and Pedestrian Plan is not financially constrained, so priorities will need to be developed separately (see Chapter 4).

The Plan begins with an understanding of basic evaluation tools and best practices for developing the Plan. This chapter provides an overview of some of those key elements. Appendix B: Bicycle and Pedestrian Standards and Guidelines, includes a comprehensive list of potential tools and applications for inclusion in the Plan.

The Plan is based in part on addressing current missing segments and deficiencies in the existing bicycle and pedestrian system. These deficiencies were defined, in part, through the public outreach for the Plan.

The Plan is also based on a technical evaluation of work, shopping, business, and recreation destinations.

### Evaluation Tools

While it would be ideal to have great bicycle and pedestrian facilities on every street within the City of Loveland, it is not practical. It is also not possible to retrofit every street within the City.

Therefore, in order to determine what bicycle and pedestrian improvements should be considered in the City of Loveland Bicycle and Pedestrian Plan, it becomes necessary to identify basic evaluation tools used for the development of the Plan.

### Bicycle and Pedestrian Level of Service

Level of Service is a method of evaluation used to identify how well a facility may operate. “Level of Service” is a common term used in evaluating automobile congestion. Similar to a report card grade, levels of service A through C are passing, level of service D is border line, and levels of service E and F are considered failing.

Ideally, the City of Loveland should strive for level of service of C or better. This is particularly important in areas which potentially have high pedestrian and bicycle demand, such as around schools, parks, and commercial/business centers.

Although the following level of service methodology was initially developed for evaluating the pedestrian system, these principals can also be applied and considered when developing the bicycle system. The five level of service measures are as follows:

1. **Directness** – Does the system provide the shortest possible route?
2. **Continuity** – Is the system free from missing segments and barriers?
3. **Street Crossings** – Can the bicyclist and pedestrian safely cross streets?
4. **Visual Interest and Amenities** – Is the environment attractive and comfortable?
5. **Security** – Is the environment secure and well lighted with good line of sight to see the bicyclist and pedestrian?

The following level of service assessments are not intended to identify specific walkability problems or improvements, but rather to identify the types of issues and concerns that might exist.

## Chapter 3 | Bicycle and Pedestrian Plan

### DIRECTNESS

The directness measure represents the actual distance from trip origin to destination. Since bicycle and pedestrian trips are highly dependent on trip length, the ability of bicycle and pedestrian infrastructure to provide the shortest and most direct route is critical. This fact is easily observed on college campuses and in parks where the most direct route is often worn into the landscape, despite the lack of paving. The ideal system is the grid system, since curvilinear street patterns add additional distance to the potential trip.

Making a decision to walk is highly correlated to distance and the time it takes to walk to your destination. If the bicycle and sidewalk system is direct and minimizes travel time, a person is much more likely to ride a bike or walk than if the route is circuitous and adds length and time to the trip. Directness is the measure of distance between destinations including home, transit stops, schools, parks, commercial areas, or activity centers.

The frequency or density of intersections also correlates with directness and walkability. A pedestrian is typically willing to walk three or four hundred feet. In downtown areas with high pedestrian activity, the frequency of street crossings needs to be higher than in outlying areas.

Barriers will impact bicycle and pedestrian travel. Freeways, rivers, and railroads can divide the community and restrict direct connections between one area and another except at a limited number of street over/under crossings.

### CONTINUITY

Continuity measures the completeness of the bicycle or pedestrian system.

A continuous sidewalk system allows the pedestrian to make an uninterrupted trip. The sidewalk system must also be of sufficient width

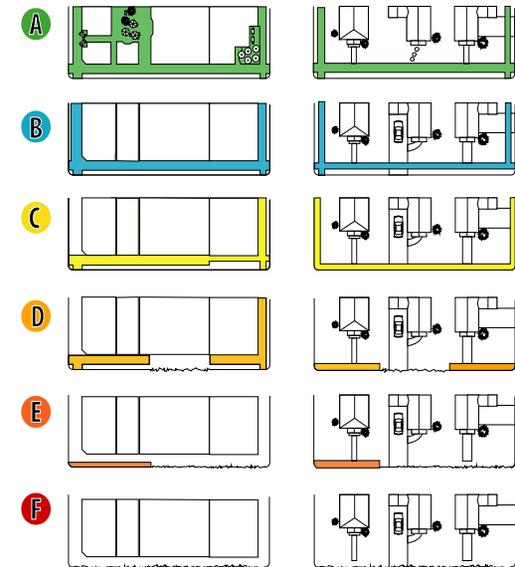


and a surface without cracks and bumps, to accommodate a stroller or wheelchair.

Similarly, a bicyclist may not make a bicycle trip if there is no system. Lack of continuity can come in the form of missing segments, broken or overgrown vegetation, or physical barriers such as discontinuous streets or fences.

If there is not a continuous pedestrian system between point A and point B, causing the bicycle or pedestrian to bike/walk in the street creating an unsafe condition, the bicycle/pedestrian trip is typically not made.

Other aspects of continuity are whether there are bicycle lanes and sidewalks along one or both sides of the street and whether there exists an overall line of sight from block to block.



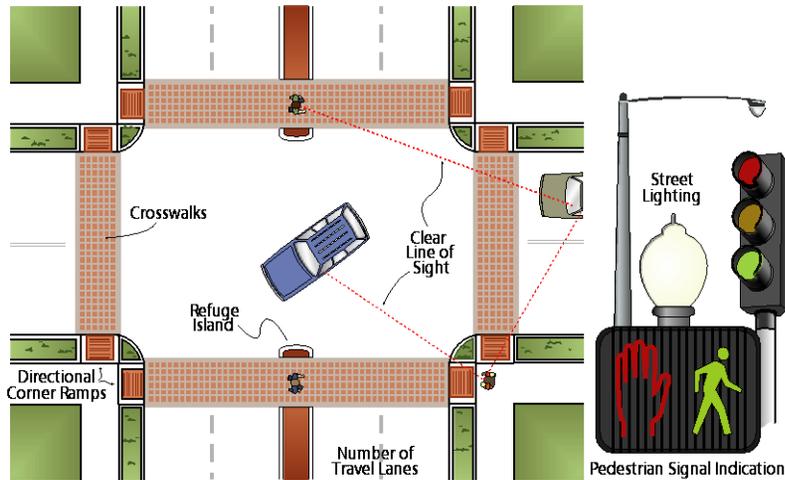
### STREET CROSSINGS

The weak link of the bicycle and pedestrian systems is often the intersections where bicycles and pedestrians must cross a street and interface with automobiles, which can result in safety concerns. As streets get wider and carry higher volumes of traffic, potential bicycle riders and pedestrians may avoid making a bicycle or pedestrian trip if safety becomes a concern. Many factors affect the bicyclists and pedestrian's real and perceived comfort and safety in crossing the street, including the following:

- The number of lanes and the widths of the lanes to cross;
- The presence of a raised median or refuge island;
- The presence of a bike lane or crosswalk;
- Use of a pedestrian actuated signal and location of push button;

## Chapter 3 | Bicycle and Pedestrian Plan

- Clear sight lines to and from the motorists with the bicyclists or pedestrians;
- Directional corner ramps,
- Street lighting; and
- The presence or lack of on-street parking which impacts vehicular and pedestrian sight distance.



### VISUAL INTEREST AND AMENITY

This measure of the pedestrian system's attractiveness and appeal is the most difficult to quantify and compare, and the most likely to change as the area matures. Some aspects of this measure relate to facilities that enhance the comfort of the user, including elements such as shade trees, street lighting, and benches that may be particularly important to pedestrians with mobility or visual impairments, but can also be important to the bicyclist. Other elements are important to visual appeal such as landscaping, planter boxes, trash receptacles, and public art.

Bicyclists and pedestrians often choose to ride a bicycle or walk depending on the quality of the environment. Areas that are pleasing and appealing with activities along the route are used much more than areas that are stark and uninviting. To promote bicycling and walking, the bicycle and pedestrian system should have a basic visual quality with some amenities.

### BICYCLE AND PEDESTRIAN SECURITY

The bike and pedestrian environment must feel like a safe place for people to walk. The key security facility element is whether the bicyclist or pedestrian is clearly visible to other pedestrians or activities. This measurement is more appropriate at a site level where one can begin to identify areas where security might be an issue at the neighborhood level. Bicyclists and pedestrians require a sense of security, both through visual line of sight with others and separation from vehicles. They also require well-lighted pathways and sidewalks for night use.

### Types of Bicyclists

One of the complexities in developing a plan is providing a bicycle system that addresses the different skill levels of all users.

The bicyclist that often commutes to work and uses their bicycle in making other trips is typically more experienced. They ride daily from point to point and typically view their bicycle as a mode of transportation. The experienced rider is much more comfortable riding their bike in a bike lane on a higher speed and volume street or with mixed flow traffic along a bicycle route.

Recreational riders are typically less experienced. They often view their bicycle as recreational or exercise equipment. They tend to prefer the separation of bicyclists and automobiles found by riding on a designated trail rather than in the mix of traffic.

Designing a bicycle system that can also include children is the most difficult. They are often inexperienced and do not understand the rules of bicycling. As determined through the crash analysis, children under 20 are involved in one-half of all bicycle crashes.

### Bicycle Facility Criteria for Locating Bike Lanes and Routes

While it may be desirable to have a sidewalk on both sides of every street to accommodate the pedestrian, a bicycle lane on every street is not practical or necessary. There is, however, some general guidance for developing a good bicycle system.

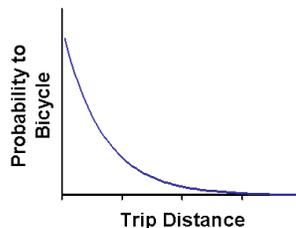
- Bicyclists want to travel to the same destinations as cars travel to. Therefore, if the primary corridor to get to these destinations cannot accommodate bike facilities then, identify a bicycle route on local streets or low volume collectors that is parallel to the major street corridor.
- Bike routes and lanes should be spaced between 0.5 and 1.0 miles apart, similar to a collector/arterial street system.
- Bicycle facilities should be reasonably continuous across the City and avoid jogs and turns to maintain continuity.
- Provide traffic signals at major intersections.

### Bicycle and Pedestrian Destinations

It is critical to identify high bicycle and pedestrian demand areas and then assess the bicycle and pedestrian facilities in those high demand areas to determine if adequate bicycle and pedestrian facilities are provided or need to be planned, to reach those high demand destinations.

To estimate potential high demand destinations eight types of potential bicycle and pedestrian activities or destinations were analyzed to create an activity index. These destinations included:

- commercial centers,
- employers,
- schools,
- senior living facilities,
- bus stops,
- hospitals,
- public housing, and
- park and recreation facilities.



A map that contains the location of each of these destinations and a one-quarter mile buffer around each activity is presented in Figure 3-1. The reason that a one-quarter mile buffer was added to each activity is that one-quarter of a mile is the general distance one may decide to walk if a good pedestrian system with safe street crossings is available. Beyond one-quarter of a mile, pedestrian trips are not often made, even with a good pedestrian system.

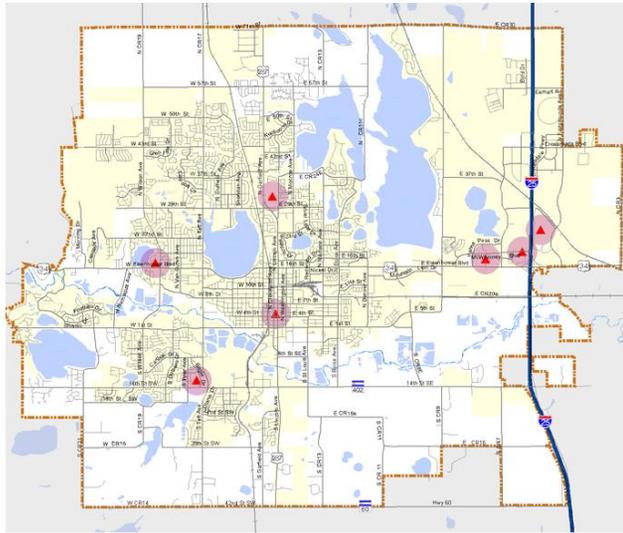
Each destination and one-quarter mile walking radius was combined to create a composite map, where the darker overlapping areas defined multiple destinations that would have high probabilities for attracting future bicycle and pedestrian trips. This map is presented in Figure 3-2. As the composite map of all destinations illustrates, major activity center destinations are located throughout the City. These activity center destinations should have good bicycle and pedestrian access and facilities. Areas with overlapping destinations are particularly prevalent in the City's downtown area, near Garfield and 29<sup>th</sup>, along the Eisenhower corridor and the Centerra area.

Completing missing segments in the system and providing good street crossings are particularly important in these higher density destination areas.

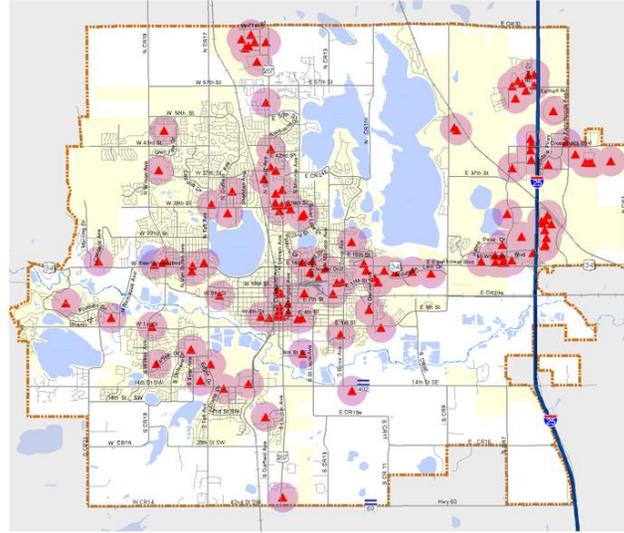
As would be expected, the primary corridors that would be used to accommodate the short trip assignment are the same corridors that contained many of the destinations bicyclists and pedestrians would want to bike or walk to. These tend to be along Eisenhower, Lincoln/Cleveland, Garfield, 29<sup>th</sup> and Taft.

It should be noted that in many cases, trying to accommodate a bicycle lane along these corridors might not be practical given right-of-way constraints or high-speed traffic volumes. Therefore, identifying parallel routes might be more practical in developing the bicycle plan.

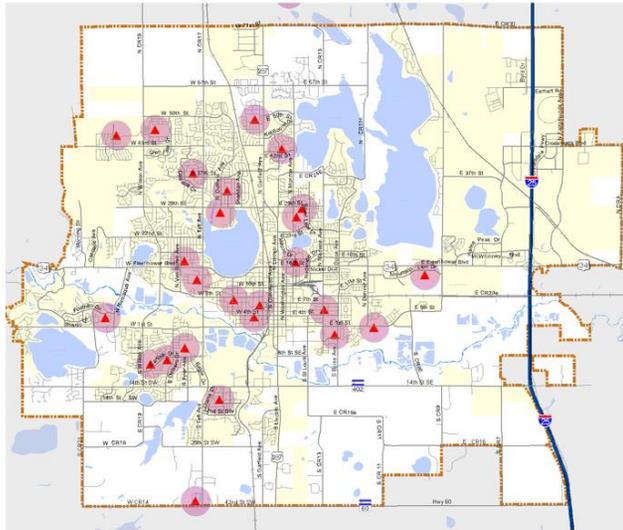
FIGURE 3-1A: LOVELAND BIKE/PEDESTRIAN DESTINATIONS



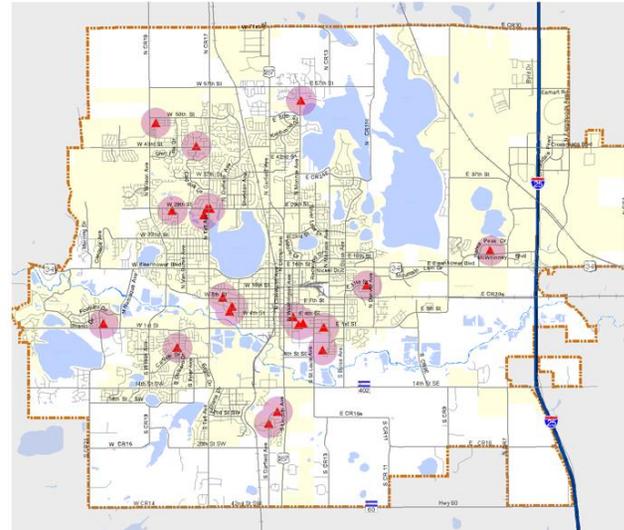
Commercial Centers



Employers (More than 100)



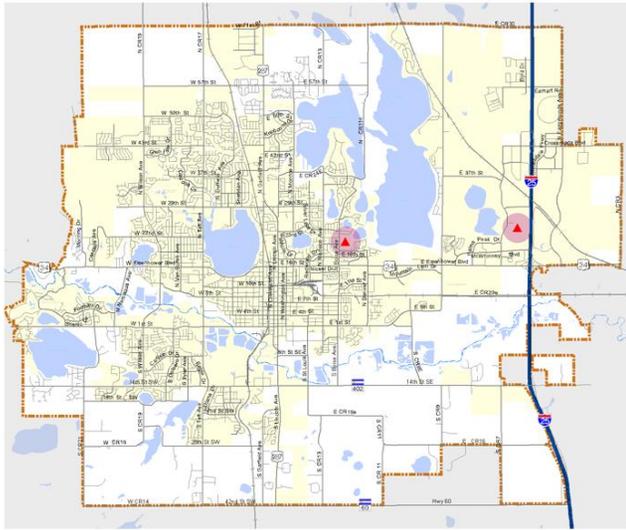
Schools



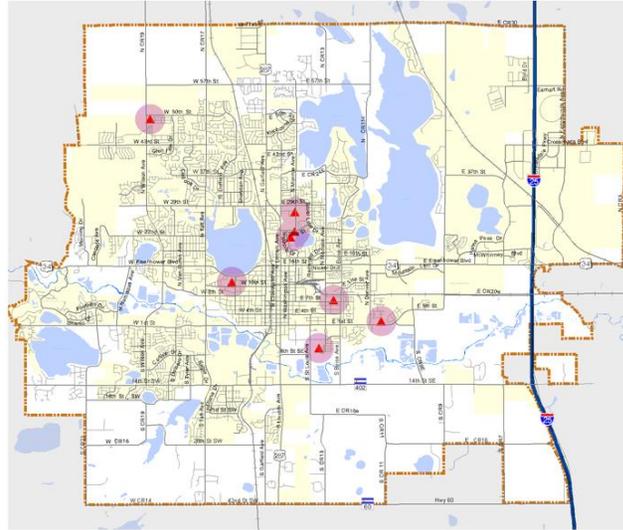
Senior Living Facilities



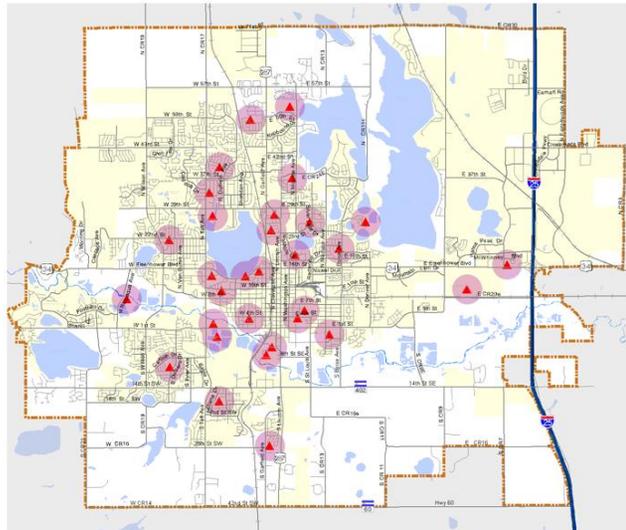
FIGURE 3-1B: LOVELAND BIKE/PEDESTRIAN DESTINATIONS



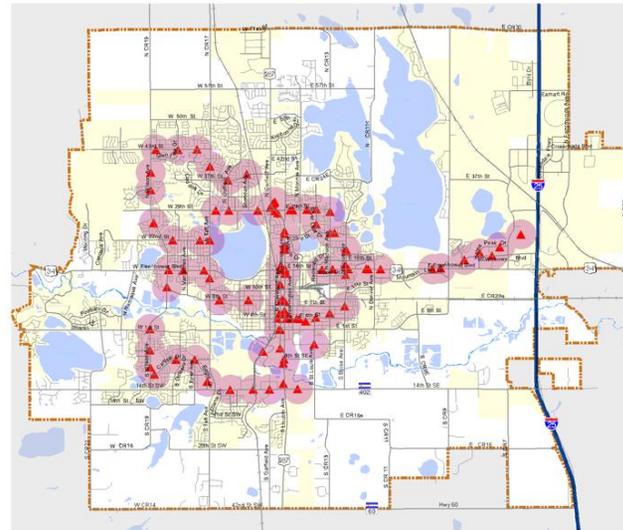
Hospitals



Housing Authority



Parks and Recreational



Bus Stops

**Legend**

- City Limits
- Growth Management Area

**Roadway Designations**

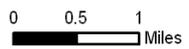
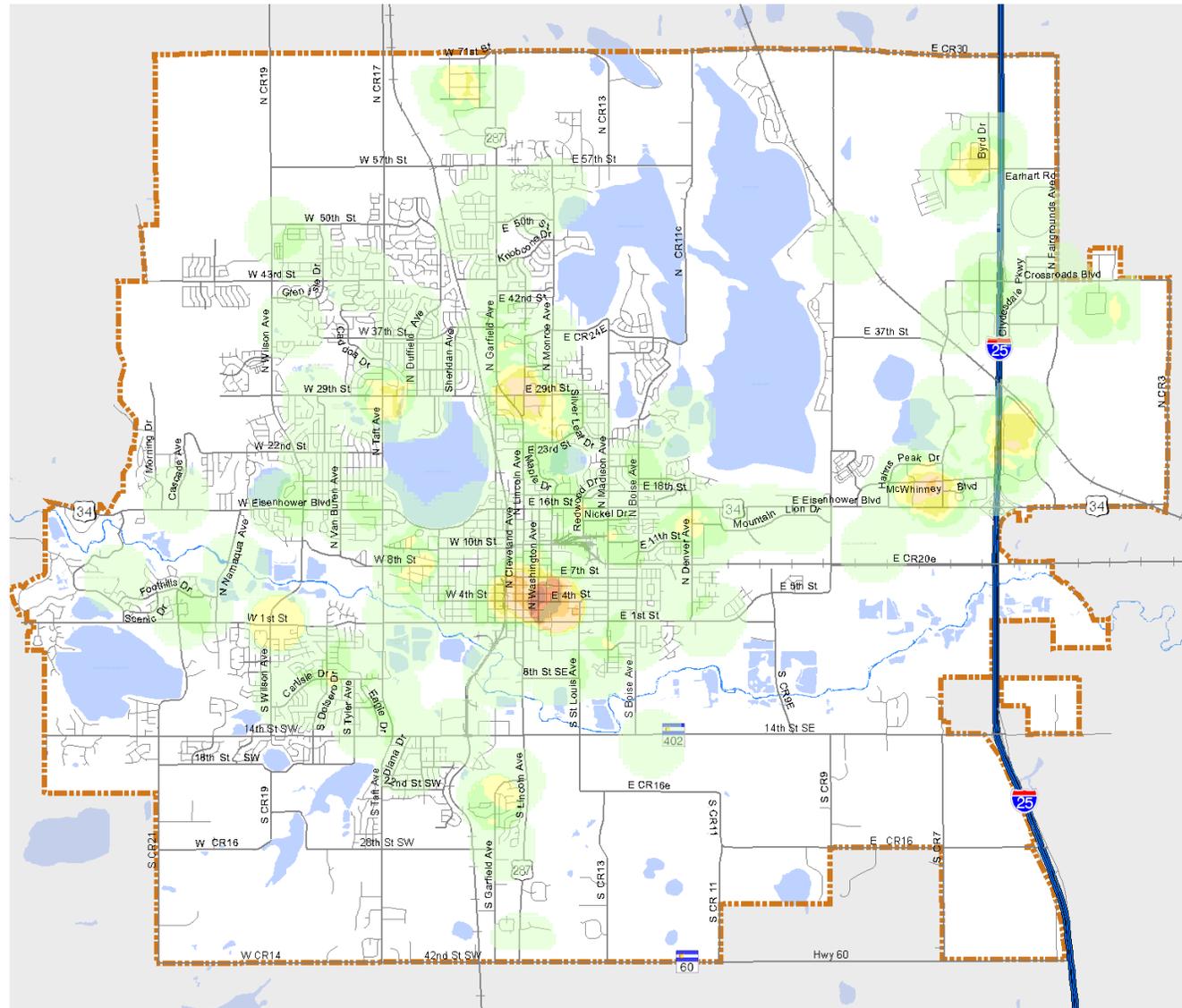
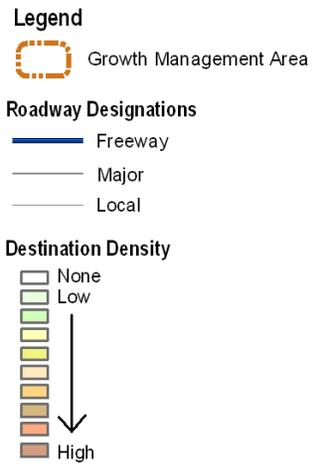
- Freeway
- Major
- Local

**Destination Designations**

- Destination
- Destination Buffer - 1/4 Mile Radius

0 0.5 1 Miles

FIGURE 3-2: COMBINED DESTINATIONS



### Proposed Bicycle and Pedestrian Plan

The development of the Proposed Bicycle and Pedestrian Plan was based on a number of sources including input from the public, Steering Committee and Technical Committee, GIS and field survey data collection, and analysis. The input and resulting analysis can be summarized as follows:

- Missing segments in the bicycle and sidewalk system,
- Crash analysis,
- Proposed bicycle and sidewalk improvements to provide access to primary destination areas,
- Sidewalks and bike lanes or trails along or parallel to the arterial street system, and
- Input from the public regarding missing segments, barriers, safety problems, and needs.

Based on the initial inventory of all identified bicycle and pedestrian improvements, there were approximately 2,000 individual bicycle and pedestrian improvements that would be needed to complete the entire bicycle and sidewalk network. However, not all of these improvements are critical.

Therefore, it was necessary to develop an evaluation process to first pare down the long list for the development of the City of Loveland's Bicycle and Pedestrian Plan. Then from the shorter list, prioritize the most important projects.

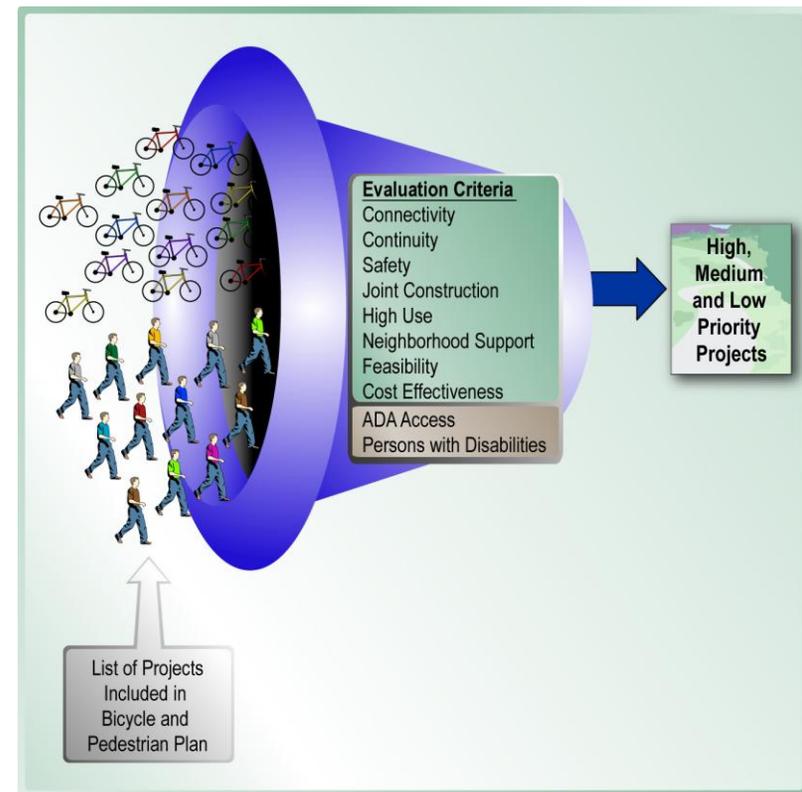
### Project Evaluation and Prioritization

In order to prioritize the bicycle and pedestrian projects, it was necessary to develop a simple and concise method to evaluate bicycle and pedestrian projects.

This consisted of developing a list of evaluation criteria that responded to the City of Loveland's issues and needs, used to develop the full list of improvements.

These needs and issues included connections to key destinations, completing missing segments, addressing safety problems, etc. Through this process, eight evaluation measures were developed with two additional measures for ADA and those projects that would directly benefit a known person with disabilities that would benefit through the project. The resulting evaluation concept is presented in Figure 3-3, with the evaluation criteria defined in the following box.

**FIGURE 3-3: BICYCLE EVALUATION AND PRIORITIZATION CRITERIA**



### BICYCLE AND PEDESTRIAN PROJECT SELECTION AND PRIORITY CRITERIA

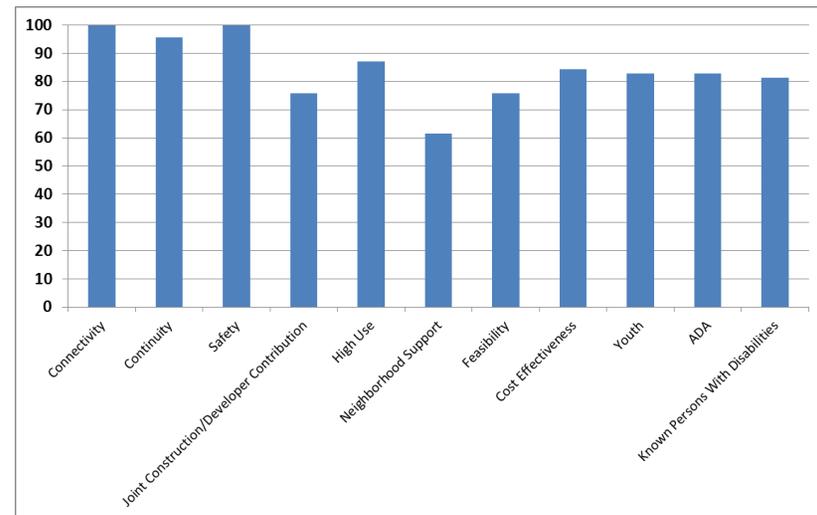
<b>Connectivity:</b>	Will the project provide connections or access to major employment, business, shopping, civic uses, schools, senior facilities, and public housing?
<b>Continuity:</b>	Does the project provide for a missing link in the system or eliminate a barrier that inhibits use?
<b>Safety:</b>	Does the project mitigate a known safety hazard?
<b>Joint Construction/ Developer Contribution:</b>	Can the project be “piggybacked” with other major project(s), such as a road widening or land development project?
<b>High Use:</b>	Will the project result in a likelihood of use (i.e., satisfy demand, increasing use)?
<b>Neighborhood Support:</b>	Is there strong neighborhood support for the project?
<b>Feasibility:</b>	Is the project ready to be implemented (i.e., right-of-way acquired, preliminary engineering completed)?
<b>Cost Effectiveness:</b>	Does the project represent a good value for the investment?

### PEDESTRIAN FACILITIES

<b>ADA:</b>	Is the project required to comply with ADA?
<b>Persons with Disabilities:</b>	Does the project provide improvements with disabilities?

Each evaluation criteria was weighted through input from the Steering and Technical Committee members who represent a wide range of bicycle and pedestrian interests within the City. Each member was asked through a web survey their opinion of the importance of each measure. The scores of each committee member was recorded and averaged and normalized to a top score of 100. The results of this weighting effort are presented in Figure 3-4 below.

**FIGURE 3-4: PROJECT EVALUATION MEASURE WEIGHTING**



As can be seen, the measures of connectivity (connections to destinations), continuity (completing a missing gap), and safety were the three highest ranked measures. Whereas the remaining measures were lower, they were all ranked as important.

Based on a simple scoring process of high, medium, and low, each project was evaluated. The projects overall priority was based on a simple sum of the products of evaluation measure score and weight.

### Bicycle Plan

The bicycle is a potential alternative to the automobile for many trips. It can also play an important role in helping the City to improve its air quality and to develop a more balanced transportation system. This element of the Transportation Plan proposes improvements to existing street and trail facilities that are presently suitable for bicycles and development of an expanded system of bicycle-friendly roads and trails for Loveland's future. The plan has been developed based on the analysis of existing conditions, as well as input from Loveland's Bicycle and Pedestrian Committee. The following mission statement was developed by the committee and guides this plan:

*“To make the City of Loveland a place where walking and bicycling are safe, accessible and convenient modes of transportation and recreation. It is the objective of this plan to improve bicycle ... and intermodal safety and mobility because the increased use of these modes of travel will have significant benefits for the community's quality of life, environment and economy. Implementation of the Plan will make it possible for Loveland residents of all ages, abilities, and income to have the choice to bicycle...to work, educational facilities, shopping centers and other destinations as an integrated component of the City's Transportation Master Plan.”*

The proposed 2035 Bicycle Plan recommends significant improvements to the existing bicycle system, including new roads with added bike lanes, improvements to existing roads without bike lanes, and a comprehensive commuter trail system to compliment the City's recreational trails system and accommodate all modes of travel. With these improvements, the future City of Loveland bike system will be of the highest quality, providing safe convenient bicycle facilities to go from virtually any place to anywhere on bicycle within the City.

As previously stated, the initial list of bicycle and pedestrian projects exceeded the needs for a system to serve the City of Loveland's non-motorized travel. In order to pare down the long list, a series of GIS analysis was performed to determine which projects might fall from the desirable complete list to a needs based list. The GIS overlay process included targeted bicycle projects that provided connectivity, continuity, addressed safety problems, and provided access to schools.

The short list of bicycle improvement included 125 projects. Based on planning level unit cost estimates, these improvements would require between \$2.8 and \$5.9 million dollars.

Based on this short list of needs-based bicycle improvements, each project was evaluated for all evaluation measures. A composite score was developed and the projects were sorted by importance. These projects were then divided by high, medium, and low importance based on their composite score. Each group accounted for approximately one-third the overall costs.

The resulting City of Loveland Bicycle Plan is presented in Figure 3-5. As can be seen, this plan includes both new bicycle lanes and enhancements to existing bicycle lanes, such as bike lane widening, stripping, and signage. These improvements are also presented for high, medium, and low priority projects.

### Pedestrian Plan

Similar to the process for developing the Bicycle Plan, the Pedestrian Plan began with a long list of potential improvements. Through the GIS overlay process pedestrian projects that provided connectivity, continuity, addressed safety problems, and provided access to schools were identified. This included 153 pedestrian improvements that included construction of new sidewalks, filling in missing segments, intersection improvements and widening of existing sidewalks. The City of Loveland's Pedestrian Plan map is presented in Figure 3-6.

The pedestrian projects are divided into high, medium, and low priority improvements based on the evaluation of each project based on the evaluation criteria. In addition, a fourth category was added, projects required of future developers. These projects are not priorities, but would be developed as part of future development.

### Coordination with Other Plans

The Bicycle and Pedestrian Vision Plan also makes reference to facilities that are controlled and planned by other entities that provide a comprehensive Bicycle and Pedestrian system. Many planned improvements are from the Colorado Department of Transportation (CDOT); Larimer County; the Centerra master planned community; as well as many regional recreational and commuter trail plans.

## Chapter 3 | Bicycle and Pedestrian Plan

Also included in the map are existing and future Recreational (Multi-Use) Trails. Although these Recreational Trails are constructed and maintained by the City of Loveland’s Park and Recreation Department, they were included in the map to illustrate the system of bicycle connections that would be available with the completion of both on-street bicycle facilities and the recreational trails. The phasing of these trails is the responsibility of the Parks and Recreation Department.

Although the Recreation Trail is primarily for recreation use and this plan deals mainly with transportation use, there is a lot of synergy between the two. Some people use the Recreation Trail for commuting while others use the bicycle and pedestrian facilities along certain streets for recreational use. Coordination is critical where the Recreational Trail connects or crosses with the bike and pedestrian facilities.

Because a lot of these planned facilities by other agencies have a lot of cross-over benefits, there may be opportunities to share in the cost and also receive bonus consideration when being evaluated for grant funding.

### Cost Estimates

As part of the development of the City of Loveland Bicycle and Pedestrian Plan, planning level cost estimates were made for the bicycle and pedestrian plan elements. Because these costs can vary significantly based on terrain, right-of-way acquisition, and structures, a low and high unit cost per linear foot was identified for each

improvement. These unit costs were applied to all bicycle and pedestrian improvements defined in the Bicycle and Pedestrian Plans. The results of this are presented in Table 3-1.

Many of the bike and pedestrian facilities in this plan will need to cross streets. How these crossings need to be handled depend on the location, classification of street to be crossed, and many other factors beyond the scope of this plan. The Bicycle and Pedestrian Plan is not intended to determine the crossing treatments at this time, however, the Plan can provide some guidance through the best practices section. The type of crossing treatment will be determined as these proposed projects are designed and constructed. A rough estimate of the additional cost for these enhanced crossing treatments has been included in the cost estimates for the Bicycle and Pedestrian Plan.

As can be seen, the total planning level cost estimate for the Bicycle and Pedestrian Plan, excluding other responsibilities, is estimated at between \$6.7 and \$13.6 million. This only includes the projects defined as the needs-based improvements to provide for a bicycle and pedestrian system of improvements to accommodate non-motorized travel demand. In addition to the City bicycle and pedestrian facilities, an additional \$6.1 to \$12.3 million of improvements will be necessary to complete the network that will be the responsibility of developers which are required to provide bicycle and pedestrian improvements per the current street standards, and bicycle and pedestrian improvements along state highways and county roads.

**TABLE 3-1: PLANNING LEVEL COST ESTIMATES FOR THE BICYCLE AND PEDESTRIAN PLAN**

	Bicycle Plan Planning Level Cost Estimates (\$ million)		Pedestrian Plan Planning Level Cost Estimates (\$ million)		Total Planning Level Cost Estimates (\$ million)	
	Low	High	Low	High	Low	High
High Priority	\$1.0	\$2.5	\$0.9	\$1.5	\$1.9	\$4.0
Medium Priority	\$1.1	\$2.6	\$0.9	\$1.5	\$2.0	\$4.1
Low Priority	\$0.9	\$1.7	\$0.9	\$1.8	\$1.8	\$3.5
Enhanced Crossings					\$1.0	\$2.0
<b>Sub Totals</b>	<b>\$3.0</b>	<b>\$6.8</b>	<b>\$2.7</b>	<b>\$4.8</b>	<b>\$6.7</b>	<b>\$13.6</b>
Other Responsibility (developers, CDOT, county)	\$3.0	\$6.1	\$3.1	\$6.2	\$6.1	\$12.3
<b>Totals</b>	<b>\$6.0</b>	<b>\$12.9</b>	<b>\$5.8</b>	<b>\$11.0</b>	<b>\$12.8</b>	<b>\$25.9</b>

FIGURE 3-5: PROPOSED BICYCLE FACILITY MAP

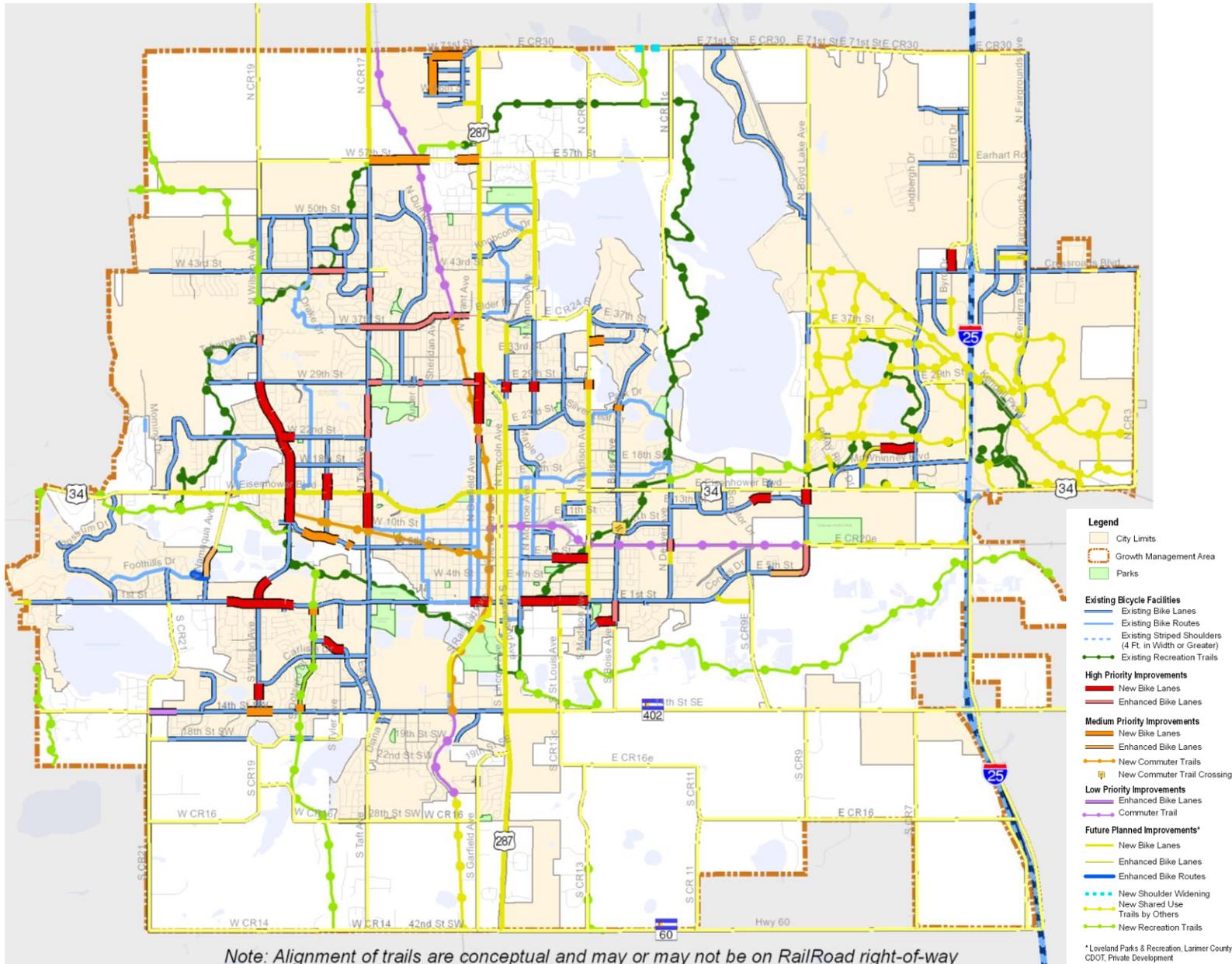
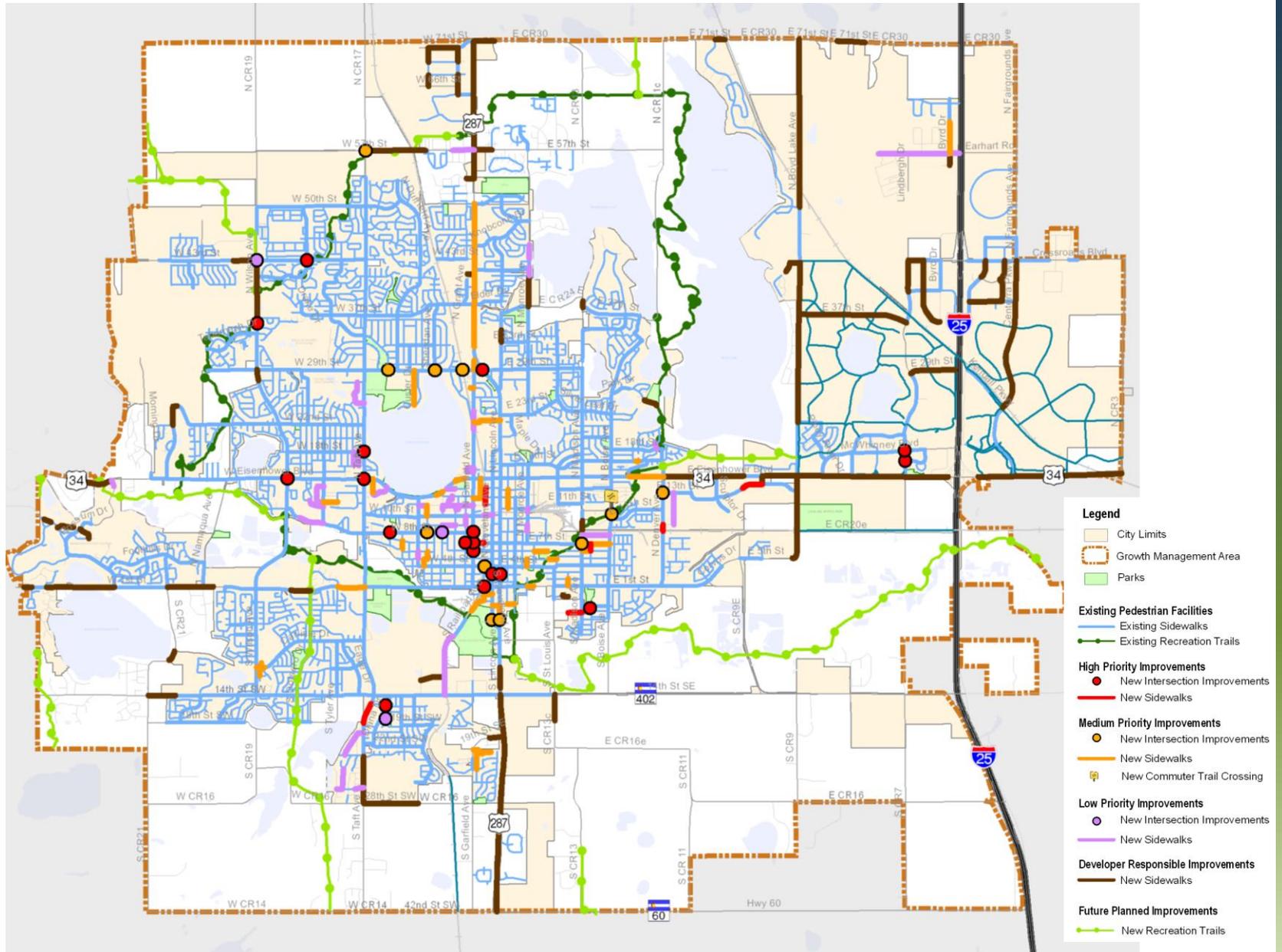


FIGURE 3-6: PROPOSED PEDESTRIAN PLAN MAP



# Chapter 4 |

## Implementation

The Plan does not present the best practices guidelines and funding tasks necessary to implement the Plan. Therefore, the purpose of this chapter is to provide a framework for implementation and funding the Plan and suggestions for future monitoring to assure the Plan is on tract.

### Implementation Strategies

As part of the development of the City of Loveland's Bicycle and Pedestrian Plan, a list and description of implementation best strategies was developed. Key implementation strategies follow with a longer list provided in Appendix B.

#### Maintenance

City Code (Sections 12.20 & 12.24) states that property owners are responsible for sidewalk construction and maintenance, including snow removal. The City of Loveland needs to be politically sensitive to how these requirements are applied. A lot of cities share the sidewalk replacement burden with the property owners on an equal (50/50) basis. The City may need to re-look into these policies to determine how this plan will affect these existing policies and codes. Broken glass and debris tend to accumulate near curbs where bicyclists ride, resulting in flat tires and accidents. Certain streets become mud-covered after rain, making the riding surface hazardous, while others are prone to icy conditions. Painted lanes delineating bike routes wear off over time and are no longer usable without proper upkeep. During the winter months, snow either gets plowed onto the right-most edge of the roadway (which forces bicyclists to ride father left) or off the roadway and onto the sidewalks.

Consistent upkeep and maintenance of bikeways should be top priority. On-street routes need to be regularly swept of debris. Bike lane lines should be repainted at least as regularly as those on the rest of the street. Weather-related obstacles such as ice and mud cannot be eliminated, but can be minimized through good design practices. Bikeway segments that regularly have these problems should be identified and corrected when and where it is possible. It is recommended that all paths that are part of the bicycle system be paved.

The Public Works Department is currently reviewing its road maintenance procedures to incorporate maintenance of bike lanes or routes on streets. A Public Works Department policy has recently been created that when an existing street with substandard bike lanes is rehabilitated, the bike lanes will be widened to the standard width, if practical. If widening the bike lanes to standard width is not possible to obtain outside of any curb and gutter section, the Public Works Departments will install "bike friendly" inlet grates to facilitate bicycle travel.

Operation and maintenance of any off-system commuter trails shown in the plan will need to be addressed, since the Public Works Department does not have any of these facilities at this time.

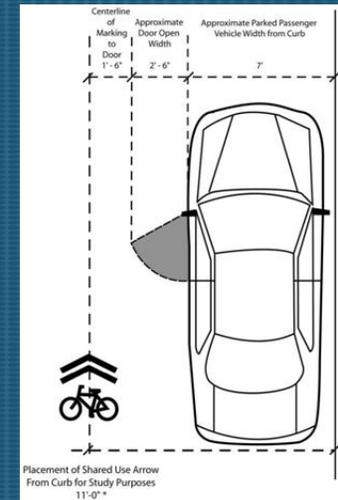
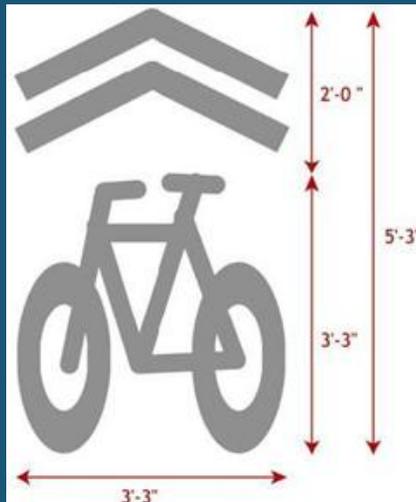
## Chapter 4 | Implementation

### Shared Lane Use Designation “Sharrow”

Sharrows are becoming a popular form of striping bike routes on lower volume roadways that are to be shared by automobiles and bicyclists. Benefits of Sharrows include:

- Encourages motorists to be more aware of bicycles.
- Increases the distance between bicyclists and parked cars.
- Increases the distance between bicyclists and passing vehicles.
- Reduces the number of sidewalk riders.
- Significantly reduces the number of wrong-way riders.

### Shared Lane Use Designation “Sharrow”



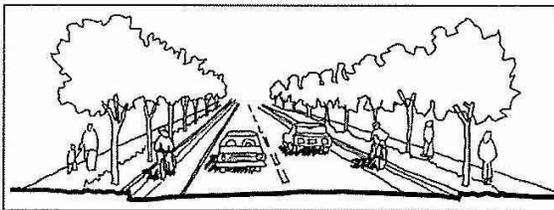
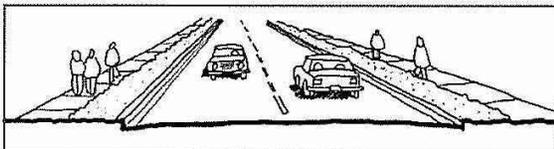
## Chapter 4 | Implementation

### Road Diet

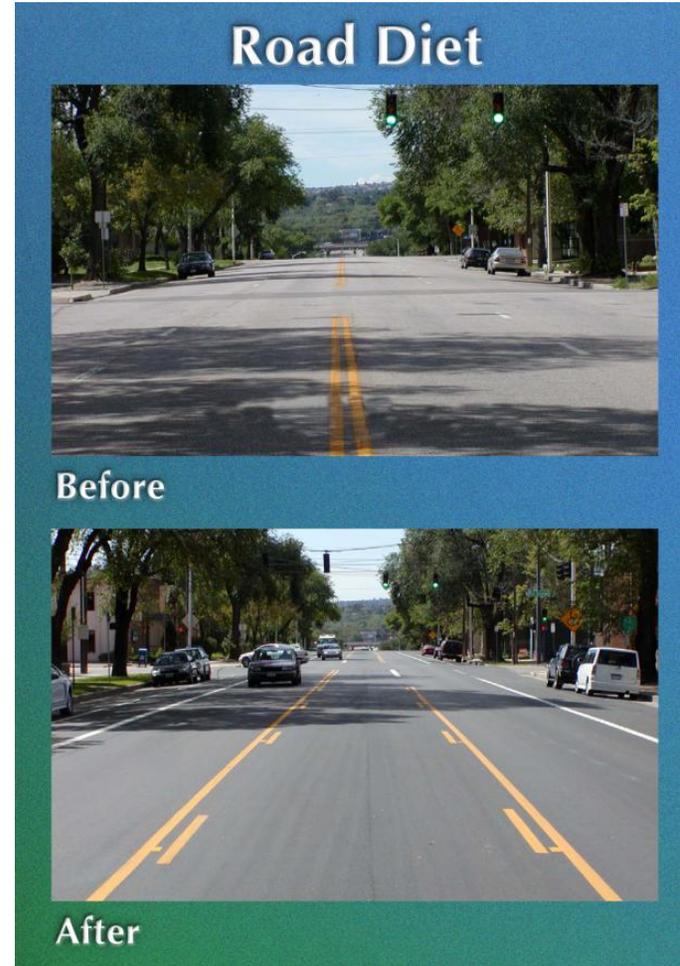
“Road Diet” is a term used to describe the process of reducing the number of travel lanes on a given roadway. Road diets are often conversions of four-lane undivided roads into three lanes (two through lanes and a center turn lane). The fourth lane may be converted to bicycle lanes, sidewalks, and/or on-street parking. Road diets have been shown to improve mobility and access for all travel modes, to enhance safety by reducing vehicle speeds, and to promote economic vitality for the community. A variety of reconfigurations are possible for lane number reductions depending on the current configuration, user needs, and potential operational and safety outcomes.

Along with lane elimination, roadway lane narrowing may also help to reduce vehicle speeds and enhance movement and safety for pedestrians and bicyclists. Lane narrowing is best used where motor vehicle speeds are low. Lane width reduction can be achieved in several different ways:

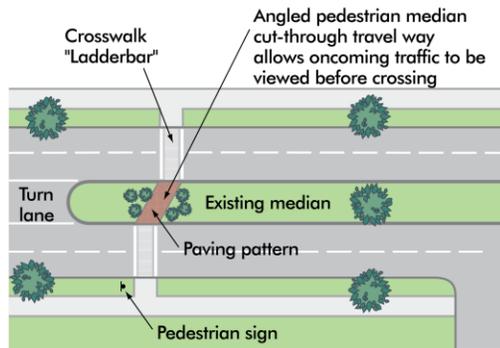
- Lane widths can be reduced to 10 or 10.5 feet and excess pavement striped with a bicycle lane or shoulder.
- Excess lane width can be reallocated to parking.
- The street and lanes can be physically narrowed by extending the curb for wider sidewalks and landscaped buffers or by adding a raised median.



Before (top) and after (bottom) width of lanes is reduced.



## Median Crossing Islands/Mid-Block Crossings



Median crossing islands help manage traffic, particularly left-turn movements, and reduce the number of potential conflict areas between pedestrians, bicyclists, and motorists. Restricted access to side streets may also help to reduce cut-through traffic and calm local streets. Median

crossing islands provide a refuge for pedestrians and bicyclists crossing a busy street at un-signalized locations. The medians must be at least six feet wide to provide sufficient waiting space for bicyclists.

The objective of a mid-block crossing is to make an off-street bike path crossing safer and more visible. Various traffic calming devices exist, such as refuge islands and speed tables, which may be appropriately used at mid-block bicycle crossings. This application is appropriate at the mid-block intersection of an off-street bikeway and a street, and is suitable for streets with faster moving traffic. A bicycle logo and "XING" pavement legend are installed prior to the crossing, at a distance dependent on the roadway design speed.

## Pedestrian Actuated Rectangular Rapid Flashing Beacon (RRFB)



One alternative to a traffic signal is the Pedestrian Actuated Rectangular Rapid Flashing Beacon (RRFB). The RRFB is a special LED flashing device installed below a crosswalk sign and placed at marked, unsignalized crosswalk locations. The RRFB increases pedestrian visibility by attracting driver attention

with the flashing beacons and making them aware of the pedestrian's presence.

## Pedestrian Hybrid Beacon- High Intensity Activated Crosswalk (HAWK)

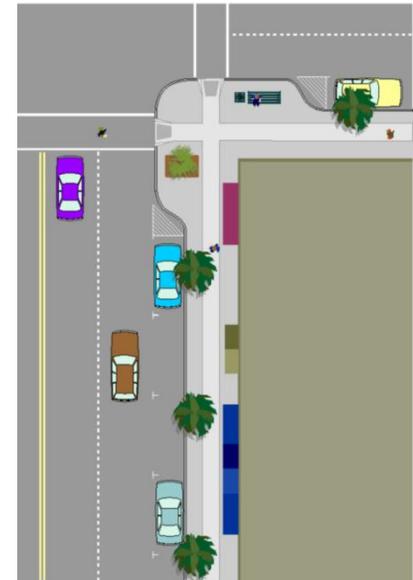


A pedestrian hybrid beacon (commonly referred to as a HAWK) uses a Yellow-Red lens configuration (two red lens on top and yellow lens on bottom) to provide a signalized, mid-block pedestrian crossing. The pedestrian hybrid beacon is used to warn and control traffic to assist pedestrians in crossing a street at a marked crosswalk. The pedestrian hybrid beacon is designed to require traffic to stop for the pedestrian walk interval (steady red) and to allow traffic movement during the flashing 'don't walk' stage of the pedestrian crossing (flashing red). The pedestrian hybrid beacon also provides flashing yellow and solid yellow warning indication to traffic that indicates the upcoming 'walk' stage/steady red.

## Bulbouts/Curb Extensions

In special applications, the City may consider bulbouts to reduce traffic speed and to improve pedestrian safety. Bulbouts are simply intersection curb extensions, which extend past the parking lanes, but not into the bicycle or through lanes. The advantages of bulbouts are as follows:

- Bulbouts provide an entry or gateway statement into activity areas or where high volumes of pedestrians are present. Entering an area where a bulbout is present



## Chapter 4 | Implementation

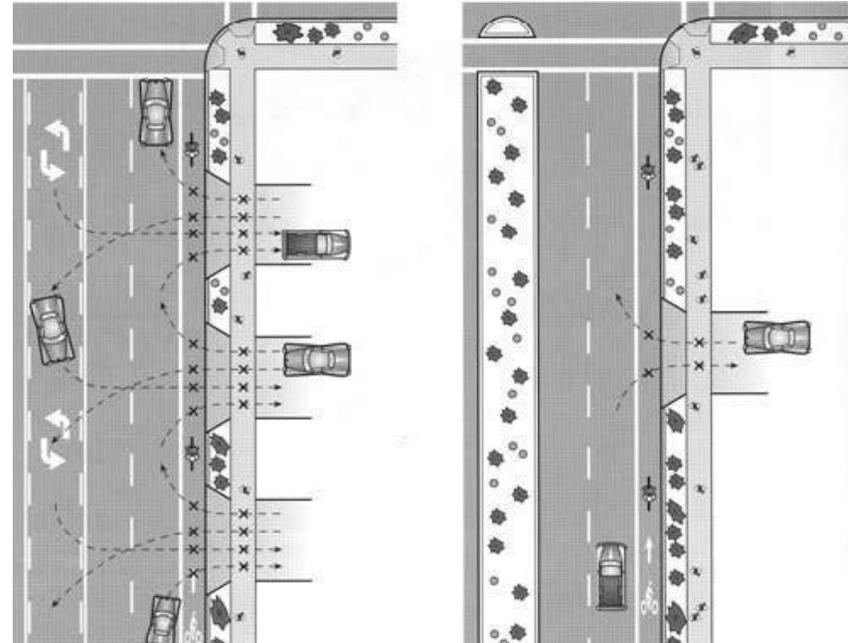
provides a clear difference between the arterial function and a local pedestrian activity area.

- Bulbouts enhance the visibility of the pedestrian because they physically permit the pedestrian to be located closer to the travel lanes, especially where parking is permitted, and allow the pedestrian to be seen more easily by the driver.
- Bulbouts constrict traffic flow through reduced lateral clearance. This reduction effects a reduction in travel speed along the corridors and improves safety for both pedestrians and vehicles.
- The bulbout changes the turning radius at the intersection, which reduces turning speed and vehicle and pedestrian conflicts.
- The extension of the bulbout reduces the time it takes pedestrians to cross from curb to curb. This reduction in pedestrian crossing time consequently reduces the time the pedestrian is exposed to moving vehicles.
- Bulbouts change the character of the intersection from automobile-dominant to pedestrian-friendly and multimodal-shared.
- Bulbouts can be an extremely positive visual and aesthetic enhancement. Features such as pedestrian lighting, planters, and benches create a focal point for pedestrian activity and change the character of the intersection from automobile to pedestrian. It should be noted that care must be taken when aesthetically enhancing bulbouts as such enhancements can block sight distances and create accident problems.

### Access Management/ Driveway Improvements

Managing the number, spacing, access, directional flow, and other aspects of driveway and side street connections protects those traveling along the roadway, including bicyclists and pedestrians, from conflicts with those entering/leaving the roadway. Access management includes such measures as limiting the number or establishing minimum spacing between driveways; providing for right-in, right-out only movements; restricting turns to certain intersections; and using non-traversable medians to manage left- and U-turn movements.

Driveway design affects sight distance for both motorists and bicyclists accessing roadways, as well as the speed and care with which drivers enter or leave the roadway. Right-angle connections are best for visibility of approaching traffic, as well as slowing the turning speed for vehicles exiting or entering the roadway. Tighter turn radii at driveways, as well as ramps to sidewalk level, also slow vehicles speeds.

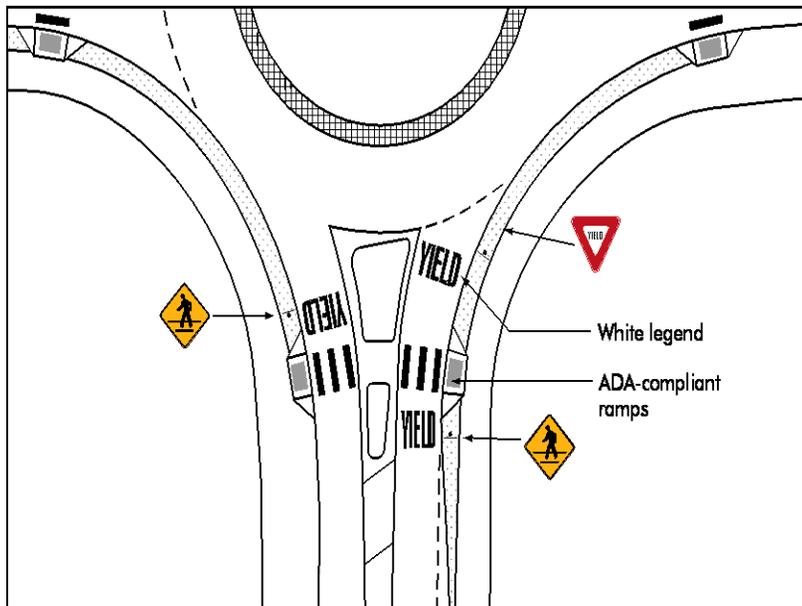


### Modern Roundabouts.

The use of modern roundabouts as an alternative to conventional stop and signal control intersections has been used at intersections within the City of Loveland. Studies conducted by the insurance industry have determined that these types of intersections result not only in a significant decrease in automobile traffic at an intersection, but also a reduction in pedestrian accidents as well.

## Chapter 4 | Implementation

Modern Roundabout Pedestrian Crosswalk Treatment



At a conventional intersection, the pedestrian faces four (4) potential vehicle conflicts:

1. Crossing movements on red (typically high-speed, illegal);
2. Right-turns on green (legal);
3. Left-turns on green (legal for protected-permitted or permitted left-turn phasing); and
4. Right-turns on red (typically legal).

Pedestrians at roundabouts, on the other hand, face two (2) conflicting movements on each approach:

1. Conflict with entering vehicle; and
2. Conflict with exiting vehicle.

The crossing of the roundabout is relatively simple. The pedestrian waits for a gap in traffic and crosses from the curb to the splitter island that provides protection, and then crosses from the splitter island to the far curb when a gap in traffic occurs. Crossing in two steps reduces the

vehicle exposure in half for each segment. In addition, safety is improved because the vehicles are forced to go slower through the roundabout than at a conventional intersection. The modern roundabout pedestrian crosswalk treatment consists of:

- ADA Compliant Ramps;
- Conventional Crosswalk Striping;
- Raised Splitter Island Pedestrian Pass Through and Refuge;
- Pedestrian Crossing Sign;
- Yield Street Markings; and
- Yield Signs.

Typically, the crosswalk is placed approximately one car length from the yield bar to permit the pedestrian to safely walk behind a vehicle that is awaiting a merge into the roundabout when traffic permits.

## Funding

Chapter 3 presented the process to develop the long-range Bicycle and Pedestrian Plan. This Plan does not include all bicycle and pedestrian improvements, but only those pared down to reflect a needs-based plan that would provide for a system of bicycle and pedestrian improvements to support non-motorized travel within the City of Loveland.

As presented previously, the total cost to implement the Bicycle and Pedestrian Plan is estimated at approximately \$6.7 and \$13.6 million dollars. Ideally, it would be important to provide for a dedicated funding source from which the City could annually select critical bicycle and pedestrian projects from the priority list of projects. Given the 25-year life span of this project, a current year annual bicycle and pedestrian funding source between \$270,000 and \$540,000 would be required.

The City of Loveland 2030 Transportation Plan is currently being updated and will become the 2035 Transportation Plan. The proposed improvements and cost estimates in this plan will be weighed with the proposed improvements and anticipated costs from the other modes of transportation (vehicle and transit). The amount of funding for bicycle and pedestrian improvements and programs will be determined within the 2035 Transportation Plan.

## Chapter 4 | Implementation

Other existing City funding is currently being used for bicycle and pedestrian improvements. The City of Loveland Public Works Department's Street Resurfacing Program – Concrete Rehabilitation Project (Target Area) currently budgets \$475,000 for curb, gutter, drainage, sidewalk, and American's with Disabilities Act (ADA) ramp improvements for streets that are being reconstructed or resurfaced. The City of Loveland Public Works Department's Street Rehabilitation City-Wide Blanket Bid Concrete Program utilizes some of its available budget for ADA ramp improvements to assist citizens with disabilities. Some of the proposed pedestrian improvements are ADA requirements.

The City should continue to pursue outside funding sources. Additional funding from the following and other sources could help leverage or offset the City's investment in bike and pedestrian improvements and programs:

**Federal** (see <http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm> for complete list)

- Safe Routes to School (SRTS)
- Transportation Enhancement activities (TE)
- Congestion Mitigation & Air Quality Improvement Program (CMAQ)
- Highway Safety Improvement Program (HSIP)
- State & Community Highway Safety Grant Program
- Highway Users Tax Fund (HUTF)
- Surface Transportation Program (STP)
- Recreation Trails Program (RTP)

### State

- Funding Advancements for Surface Transportation & Economic Recovery (FASTER)
- Great Outdoors Colorado (GOCO)
- Department of Local Affairs (DOLA)

### Private

- SRAM Cycling Fund
- Bikes Belong Grant

Investment in the bicycle and pedestrian system also improves the City's economic vitality. The study, Estimating the Employment Impacts of Pedestrian, Bicycle, and Road Infrastructure, examined job creation data from 2008 provided by Baltimore, Maryland and found that pedestrian and bike infrastructure projects create 11 to 14 jobs per \$1 million of spending, while road infrastructure initiatives created 7 jobs per \$1 million of spending. The linkage between retaining young professionals between 25 and 50, who are the primary income producers in a City, have an increased propensity to stay if there is a good bicycle and pedestrian system.

Another positive aspect of investment in bicycle and pedestrian improvements is that they have a minimal operating and maintenance costs when compared to other capital projects.

It will be important that City staff be good stewards with the available resources. As an example, some projects can be as simple as moving painted lines on streets after new surfaces are placed from the existing street rehabilitation or maintenance program. Many of the projects can be done in house, like the signage and striping.

The future bicycle and pedestrian plan is a high priority to complete a system of bicycle and pedestrian improvements that allow citizens that cannot drive or people who cannot afford a car to bike or walk to work.

## Policy Recommendations

### Code Enforcement

As mentioned earlier, the City of Loveland currently has existing codes and ordinances that if enforced would address much of the needed plan improvements and would create a much more useable bicycle and pedestrian system. As an example, there are already existing ordinances that require property owners to maintain their sidewalks or require new developments to provide for bicycle and pedestrian improvements. Providing enforcement on these existing rules is very important to the success of the Plan.

### Coordination

Coordination and communication among the various City Departments regarding bicycle and pedestrian planning and implementation of improvements or programs is critical. During a recent re-organization within the City of Loveland, a new position within the Public Works Department was created in 2009 that included part time responsibility as a Bicycle and Pedestrian Program Manager. The City's current internal and external review processes should be re-evaluated to incorporate this new position to help with coordination and implement the Plan effectively. Authority for this position and the ability to leverage funds for bicycle and pedestrian improvements that can be incorporated into projects by other entities have proven to have the greatest success. The duties of the existing Bicycle and Pedestrian Program Manager also include coordinating City bicycle and pedestrian planning efforts and programs with other local, regional and state agencies.

### The 5 E's – Engineering, Education, Enforcement, Encouragement, and Evaluation

Facilities are only one of several elements essential to building a successful bicycle and pedestrian planning transportation system. With bicycle and pedestrian safety education and training encouraging walking and bicycling, and enforcing the rules of the road as they pertain to bicyclists, pedestrians, and motorists should be combined with facilities development to form a comprehensive approach to bicycle and pedestrian use. The Colorado Guide for the Development of Local and Regional Bicycle and Pedestrian Plans identifies the 5 E's - Engineering, Education, Encouragement, Enforcement, and Evaluation – as the basis for comprehensive bicycle and pedestrian planning.

- **Engineering.** Engineering includes facilities, maintenance, and parking. An adequate bicycle or pedestrian transportation system is one that allows users with varying abilities to safely and efficiently travel from origin to destination. Bicycle facilities include on-street facilities such as bike lanes, bike routes, low-volume roads and roads with adequate shoulders, and off-street facilities such as paths, bridges, overpasses, and underpasses.
- **Education.** Education of the public is the most important element in reducing bicyclist and pedestrian injuries, reducing hostility between the various transportation modes, ensuring that the law is obeyed, and facilities are properly designed and

built. Bicyclists, pedestrians, and motorists need safety education. Police officers need education regarding the manner in which to enforce bicycle and pedestrian laws, and engineers and planners need facility design education.

- **Encouragement.** Encouraging bicycling and walking can help mitigate air pollution and traffic congestion, as well as promote healthier, friendlier communities. One-way trips of five miles or less are often suitable for bicycling. Often bicyclists are willing to travel even further distances for commuting trips or recreation. Shorter trips are often suitable for walking. Providing safe, well-designed and maintained facilities encourages bicycling and walking. Annual events, such as Metro Rides Bicycle and Trails Festival, CDOT's Colorado Bike Month (June), Bike to Work Day, Colorado Pedestrian Month (October), Walk to School Day, and National Trails Day promote bicycling and walking through events and media attention. These events are designed to celebrate non-motorized transportation, encourage people to bicycle or walk, build awareness through safety campaigns in the media, and institutionalize bicycling and walking as viable modes of transportation.
- **Enforcement.** Enforcement goes hand in hand with education. Education is not effective if there is not enforcement to back it up. Therefore, it is important to enforce the rights and responsibilities of all modes of transportation by ticketing motorized and non-motorized transportation users alike. Bicyclists and pedestrians should be expected to be ticketed for traffic offenses the same as motorists.
- **Evaluation:** Evaluation involves monitoring outcomes and documenting trends through data collection before and after transportation improvements. Evaluation includes review of existing policies and standards, monitoring traffic volumes and flow, evaluating crashes, prioritization of future projects and identifying potential funding sources.

### SAFE ROUTES TO SCHOOL

The City of Loveland's Public Works Department has partnered with the Thompson School District to promote the Safe Routes to School Program. This program benefits children and the community by reducing traffic congestion in school zones, improving air quality, increasing physical activity of children and adults, and promoting safe neighborhoods.

Safe Routes to School (SRTS) is a program that encourages families to use alternative modes of transportation, such as walking, riding a bike/scooter, or rollerblading when going to school. Exercise and safety are key components of the program.

In 1969, roughly half of all 5 to 18 year olds walked or biked to school. Today, nearly 90% are driven by vehicle or bus. Loveland's SRTS Program hopes to change these statistics locally.

With more students walking or bicycling to school, traffic congestion around school zones will decrease, creating safer school zones. Students will become more active, leading to healthier habits.



Collins Bicycle Co-op, Fort Collins Cycling Club, Bike Fort Collins, City of Fort Collins Police Department, CSU Police Department, PVHS Ambulance Service and Boys & Girls Clubs of Larimer County. The group is currently focused on Safe Routes to School, senior citizens, bicycle commuters, and CSU students.

Several local organizations, including the City of Loveland, teamed up to form a coalition to address bicycle and pedestrian safety in November of 2009. The coalition adopted the name Bicycle Pedestrian Education Coalition (BPEC) and now serves as the primary forum for discussing and implementing bicycle safety and education programs in the community. It is our hope that the Bicycle Safety Education Plan will serve as a guide for the City, BPEC members, and other community groups that wish to educate bicyclists of all ages in a consistent and thematic manner.

### Bike Wise

Bike Wise (Linking Northern Colorado) is the regional extension of the City of Fort Collins' bike program. Bike Wise was created in order to encourage and expedite regional connections among cities in Northern Colorado; to share best bicycle planning practices with respect to infrastructure and facilities; and to provide consistent bicycle safety education and encouragement outreach throughout Northern Colorado. It is the mission of Bike Wise to create a bicycle friendly region, in that, no matter what city or town you travel in, bicycle safety and accessibility will be prioritized.

### Bicycle and Pedestrian Education Coalition (BPEC)

The Bicycle and Pedestrian Education Coalition (BPEC), through education and encouragement, works to reduce the number of motor vehicle/bicycle/pedestrian crashes in our community, and increase knowledge and awareness about how to safely share roads. The BPEC works to increase the number of bicycle riders and pedestrians in the community, nurturing health and wellness. BPEC utilizes the League of American Bicyclists' bike education curriculum throughout Larimer County. Healthier Communities Coalition of Larimer County coordinates BPEC, with other members including City of Fort Collins, City of Loveland, Colorado Injury Control Research Center at CSU, Safe Kids Larimer County, Poudre School District, Thompson School District, Fort



It is anticipated that participation will include representatives from municipal and county governments, the North Front Range Metropolitan Planning Organization, and non-profit organizations throughout the Northern Colorado region. It is envisioned that an advisory committee comprised of these stakeholders to provide guidance, direction, momentum, resource sharing, and overall collaboration to plan for and create a bicycle friendly region, safely boost transportation and recreation options, as well as, create tourism destination opportunities in Northern Colorado.

### Performance Measures and Critical Success Factors

Defining success and measuring performance is essential to execution of any plan, both in the short and long term. In the 2020 Transportation Plan, no clear performance measures were defined and enunciated to assess Loveland's progress in meeting the criteria defined in the Transportation Plan. The 2030 Transportation Plan is a dramatic step forward in this direction.

The measurement of the Plan is tied directly into the City of Loveland and Public Works Performance Measurement system. Annually, the Department of Public Works will publish Transportation Master Plan Performance Results in the Public Works Department Annual Report. Performance Measures that will be included the annual report is as follows.

### Bike/Pedestrian Measures

- Total Bike Facilities
- Percent Change in Bike Facilities
- System Missing Link Percentage
- Total Pedestrian Facilities
- Total Bike Facilities
- Percent Change in Bike Facilities
- Percent Pedestrian Facilities ADA-Compliant

These data points represent a sampling of measures that will be included in the annual transportation report. Each factor will be tracked for the current year as well as past years with applicable data. Recommended annual performance goals in each area will define progress toward the key achievements defined in the 2035 Transportation Plan.

# Appendix A |

## Vision, Goals and Objectives

The City of Loveland's Comprehensive Plan contains extensive vision statements, goals and objectives regarding bicycle and pedestrian mobility. These statements address a wide range of important activities within the City including community design, transportation, parks and recreation, education and community health. The City's Transportation Plan also defines goals specific to bicycle and pedestrian mobility and implementation. A complete list of all of these bicycle and pedestrian related vision statements, goals, objectives and guiding principles are contained in the following appendix.

### City of Loveland Comprehensive Plan

The City Council adopted the 2030 Vision, created by Loveland residents in a series of public workshops. The City of Loveland Comprehensive Plan outlines the following visions, goals and objectives that relate to bicycle and pedestrian forms of transportation.

#### Vision Statement 1

**Loveland is a community that is characterized by welcoming neighborhoods with diverse housing opportunities that create a sense of individual belonging.**

#### COMMUNITY DESIGN

Neighbors will still talk on front porches, walk down neighborhood streets, stroll or read in neighborhood parks, and visit the local barber or dry cleaner.

Most impediments to mobility for persons with disabilities will have been removed. Adequate curb cuts will have been provided on pedestrian routes...

***Guiding Principle 1: Foster attractive development that enhances Loveland's built environment and encourage development that is sensitive to the distinctive character of Loveland.***

#### COMMUNITY CHARACTER

Goal 1.3: Encourage development that is sensitive to the character of Loveland.

*Objective 1.3.2: Create pedestrian/bike paths that are safe and interconnected to points of attraction (school facilities, retail shops, parks, recreation centers, city and regional trail systems and open spaces) within and adjoining the development.*

#### REDEVELOPMENT AND AREA PLANNING

- The Downtown will have been revitalized as a pedestrian-friendly area with shopping, restaurants, cultural facilities, employment, and housing.
- A pedestrian mall near the Loveland Gallery/Museum will have become a favorite destination and a successful business location.
- Because the Downtown will continue to have a strong residential base, services such as banking, grocery, drug, and hardware stores will have been centrally located near transit stations, which will have been situated so as to be very accessible by pedestrians. While most people will have chosen to come to Downtown by transit, walking, or cycling, sufficient automobile parking will have remained available. Pedestrians will have found it easy to get around in the Downtown.
- The Big Thompson Riverwalk will have connected the redeveloped Old Fairgrounds to the Downtown, linked to the larger Loveland Trail system, and provided a lush green retreat.
- Because the Downtown district has proven extremely popular as a place to live and do business, a new, traditional, urban-style walkable neighborhood will have been built in the area of the revitalized Sugar Factory.

## Appendix A | Vision, Goals and Objectives

**Guiding Principle 3: Formulate appropriate strategies and policies for geographic areas within Loveland needing redevelopment, renewal, and/or more detailed planning analysis, such as the Downtown, districts, corridors, neighborhoods, community separators, and transit-oriented developments.**

### General Redevelopment Planning

Goal 3.1: Foster reinvestment in, redevelopment and adaptive reuse of, existing abandoned or underutilized buildings, and vacant and brownfield sites.

*Objective 3.1.4: Provide opportunities to retrofit aging single-use commercial and retail developments into walkable, mixed-use communities.*

## Vision Statement 2

**Loveland is a community that embraces the heritage and natural beauty of the region and values its strategic location.**

### NATURAL AND SENSITIVE AREAS

**Guiding Principle 5: Protect regional lands and lands within the Loveland GMA that have important natural resource, recreational, agricultural, and viewshed values from encroachment by the human-built environment.**

### Management and Access

Goal 5.3: Maintain open lands according to management type, meaning that wildlife areas should remain relatively undisturbed; public access areas should be made available for recreational use; and restorative areas should be slated for enhancement.

*Objective 5.3.4: Plan and create a system of natural soft-surface trails within public access areas that link with other partnership trails while respecting wildlife and natural resources.*

## Vision Statement 3

**Loveland is a well-planned and environmentally sensitive community where all citizens are safe, secure and have equal access to services and amenities, including recreational and cultural activities.**

### PARKS AND RECREATION

The City's recreation facilities and programs, parks, trail system, and golf facilities and programs will have remained an integral part of the community.

Parks and trails will have played an important part in Loveland's quality of life, with recreational opportunities available for all. Programmed and drop-in use recreation for a variety of age groups will have remained affordable and accessible, thereby allowing Loveland residents to lead healthy and active lives. The Loveland Trail system will have remained just one example of drop-in recreational activity - providing places to jog, walk, and bike within all four quadrants of the City. The trail system will have supplemented commuter routes and connected recreational resources to other areas of interest in the city and surrounding area. A family bike ride to Boyd Lake or around the Loveland Trail will have remained a favorite weekend activity.

**Guiding Principle 6: Ensure that the City's recreation facilities and programs, parks, trail system, and golf facilities and programs remain an integral part of the community through an abundance of offerings, both structured and unstructured, that satisfy the community's leisure-time needs.**

### Trails

Goal 6.3: Complete the Loveland trail system as an off-road, non-motorized path which is used by bikers, joggers and walkers, and that capitalizes on the natural environment.

*Objective 6.3.1: Provide trail facilities necessary or desirable to meet the future needs of the community.*

*Objective 6.3.2: Evaluate the established trails levels-of-service to ensure that they meet the needs of the community.*

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Objective 6.3.3: Ensure that trail facilities are provided in a timely, orderly, and cost-effective manner.

Objective 6.3.4: Coordinate the provision of trails facilities with other local governments, special districts, state government and the Thompson R2-J School District as appropriate.

### Recreation Facilities

Goal 6.4: Promote the health and welfare of the community by providing indoor recreational facility(s), accessible by auto, city transportation, and/or the Loveland Trail, which offers structured and unstructured recreational opportunities as well as a social gathering place for Loveland residents.

### POLICE

Loveland will have remained a safe community with a low crime rate. Residents will have continued to feel safe walking anywhere in the city.

***Guiding Principle 8A: Provide, establish, and sustain innovative community policing programs in accordance with nationally-recognized accreditation standards and maintain the necessary facilities to enable those programs.***

### Programs and Activities

Goal 8A.3: Provide programs and activities that engage the community, enhancing public safety, and promote community-based problem solving.

Objective 8A.3.5: Increase the community's perception of safety by maintaining such programs as the "take home" car plan and by engaging in education campaigns.

Objective 8A.3.6: Maintain resource officer and related programs in schools.

### FIRE AND RESCUE

Governing boards of emergency services will have supported various community focused health and safety programs for the underserved and at-risk populations such as seniors and youth.

***Guiding Principal 8B: Protect life and property through adequate and strategically-located fire and rescue facilities coupled with a wide range of emergency fire and rescue-related services and programs.***

### General

Goal 8B.1: Review and periodically update the Fire and Rescue Strategic Plan.

*Objective 8B.1.2: Explore additional regional planning opportunities related to Fire/Rescue and Public Safety and integrate them into local planning efforts.*

### LAND USE AND THE ENVIRONMENT

Neighborhoods will have been designed to offer their residents a variety of amenities within walking distance.

Most large neighborhoods developed since the year 2000 will have included mixed-use neighborhood centers, pedestrian-friendly, neighborhood-scale shopping, recreation and cultural facilities, natural open spaces and trails, schools, and places of worship.

Innovative land use planning policies coupled with flexible zoning codes will have encouraged the creation of small clusters of shopping and employment accessible to transportation and neighborhoods. By integrating new neighborhoods and older, more traditional ones with the trail infrastructure, Loveland will have become a city that is truly walkable and aesthetically pleasing.

***Guiding Principle 9: Guide the development of the community within the Loveland Growth Management Area in order to meet present and future needs, while protecting the health, safety, order, convenience, prosperity, energy and resource conservation, and the general welfare of the citizenry.***

## Appendix A | Vision, Goals and Objectives

### Future Land Use Pattern

Goal 9.2: Provide a general pattern for the location, distribution and character of the future land uses within Loveland's Growth Management Area.

*Objective 9.2.3: Include development of multi-use activity centers at the regional, community (Downtown), and neighborhood levels as a part of the Land Use Plan.*

*Objective 9.2.5: Encourage the development of multi-use, high-quality employment districts where campus-type settings are appropriate, particularly along the transportation corridors of I-25, US 34, and south side of SH 402.*

### Vision Statement 4

Loveland is a community with an integrated system of technology, utility and transportation networks that supports a vital economy; and that coordinates with the plans of other regional governmental entities.

#### REGIONAL PLANNING, TRANSPORTATION, AND AIR QUALITY

The City will have fully supported and participated in regional multimodal transportation and air quality maintenance efforts.

***Guiding Principle 10A: Recognize Loveland's importance and impact as a major urban area within the Northern Colorado region and support regional multi-modal transportation options and air quality maintenance efforts.***

#### General

Goal 10A.1: Engage in regional planning where appropriate in order to address problems of a regional nature and/or to seek efficiencies in service provision.

*Objective 10A.1.2: Seek opportunities to coordinate with other local governments, special districts, school districts, and state and federal agencies on the provision of community facilities that have multi-jurisdictional impacts.*

### Regional Transportation and Air Quality Planning

Goal 10A.2: Coordinate the recommendations of the region's Transportation Plan prepared by the North Front Range Metropolitan Planning Organization (NFRMPO) with the recommendations of the City's Transportation Plan.

*Objective 10A.2.1: Assist in defining the current transportation system in the North Front Range and forecast the need to 2030.*

*Objective 10A.2.2: Identify the regional transportation needs of Loveland.*

*Objective 10A.2.3: Anticipate the revenues available to the area and assist in ensuring that monies are allocated according to Federal Highway Administration, Federal Transit Administration and Colorado Department of Transportation requirements.*

#### LOCAL TRANSPORTATION

The City will have planned a safe, efficient, continuous, coordinated, and convenient multi-modal transportation system that will have served the current needs of the community and will have established the foundation for a transportation system that will be sustainable for future generations.

Local transportation infrastructure, including roads, transit, and trails, will have been provided in a timely and efficient manner as Loveland grows. The policies that require that growth pay for itself will have enabled the City's finances to remain stable. Infrastructure provision will have kept pace with growth, and will have served both older and newer neighborhoods.

Loveland will have developed an efficient, truly multi-modal transportation system providing quality and flexible transportation choices, both regionally and locally.

Most through-traffic will have been confined to major roads and parkways, while residential areas will have remained relatively free of high volumes of traffic. This will have also allowed pedestrians to walk and bike safely within their neighborhoods.

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Locally, people will have remained able to get around Loveland easily via public transit, foot, bicycle, or car as compared to other communities of its size.

Parking in the Downtown will have remained convenient in most locations because the public will have taken full advantage of multiple modes of transportation.

***Guiding Principle 10B: Plan a safe, efficient, continuous, coordinated, and convenient multi-modal transportation system that serves the current needs of the community and establishes the foundation for a transportation system that is sustainable for future generations.***

### General

Goal 10B.1: Review and periodically update all components of the 2020 Transportation Master Plan.

*Objective 10B.1.1: Review and amend the 2020 Transportation Master Plan as appropriate.*

*Objective 10B.1.2: Engage in broad-based community involvement such that each individual in the community is aware of pertinent transportation-related issues and their role in finding solutions.*

*Objective 10B.1.3: Acknowledge the interdependent relationship between land use and transportation and attempt, through the process of ongoing review, monitoring, and revision, to negate the “cycle of impacts” one has on the other.*

*Objective 10B.1.4: Evaluate the costs and potential impacts associated with the various modes of surface transportation.*

*Objective 10B.1.5: Determine the purpose, time, destinations, physical improvements, and policies needed to achieve a given level-of-service and the costs and implication associated with that determination.*

*Objective 10B.1.6: Continue to monitor the growth patterns within the community in order to design and construct infrastructure improvements that address long-term needs concerning growth, land use, and sustainability.*

*Objective 10B.1.7: Investigate the impacts constructing new infrastructure has on maintenance and operations activities and costs.*

*Objective 10B.1.8: Investigate all reasonable options for financing capital, operations, and maintenance costs for transportation and develop an implementation strategy that recognizes current funding realities and limitations.*

### Traffic Circulation

Goal 10B.3: Maintain the overall ease of travel as the city grows while meeting or exceeding the level-of-service expectations.

*Objective 10B.3.1: Provide a street network necessary or desirable to meet the future needs of the community.*

*Objective 10B.3.2: Evaluate the established street levels-of-service to ensure that they meet the needs of the community.*

*Objective 10B.3.3: Ensure that streets are provided in a timely, orderly, and cost-effective manner.*

*Objective 10B.3.4: Coordinate the provision of the street network with other local governments, state and federal government, and special districts, as appropriate.*

### Bicycle and Pedestrian Circulation

Goal 10B.4: Plan and implement improvements to existing street and trail facilities that are presently suitable for pedestrians and bicycles and develop an expanded system of pedestrian and bicycle-friendly roads and trails for Loveland’s future (see also Trails in GP6)

*Objective 10B.4.1: Provide bicycle and pedestrian facilities necessary or desirable to meet the future needs of the community.*

*Objective 10B.4.3: Ensure that bicycle and pedestrian facilities are provided in a timely, orderly, and cost effective manner.*

*Objective 10B.4.4: Coordinate the provision of bicycle and pedestrian facilities among various government departments, and with other local governments, state and federal government, special districts, and the Thompson R2-J School District, as appropriate.*

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### Transportation Demand Management

Goal 10B.6: Plan and implement transportation demand management (TDM) programs that seek to change travel behavior, encourage residents to recognize the impacts of driving alone, and encourage residents to choose alternative modes or means of travel.

*Objective 10B.6.1: Seek opportunities to reduce the proportion of trips that are taken in single-occupancy vehicles.*

### FORT COLLINS - LOVELAND AIRPORT

The airport will have remained easily accessible by transit, car, or bicycle for customers and employees.

## Vision Statement 5

Loveland is a community that is a continuously developing partnership of citizens, business, health, and educational communities; with a stable and diverse economic base that offers ample employment and business opportunities to all.

### EDUCATION – GENERAL

A system of education will have been provided that meets the needs of the entire community.

While the Thompson R2-J School District, and various private schools, will have remained focused on pre-K-to-12 core education, other educational institutions within the Loveland community will have provided a variety of learning opportunities, including college preparation, cultural and athletic enrichment, high-quality trade, vocational, and continuing education, and business programs.

***Guiding Principle 14: Foster a system of education that meets the needs of the entire community***

### General

Goal 14.1: Continue to seek opportunities for cooperation among the City service providers, including the Loveland Public Library, and all public and private education providers.

*Objective 14.1.1: Continue to seek opportunities for Thompson R2-J School District, Aims Community College, Front Range Community College, other education providers and partners, and the City to co-locate and share facilities at new and existing school sites.*

*Objective 14.1.2: Continue cooperation on education programs offered through the City, the school district, private education providers, and homeschool providers.*

*Objective 14.1.3: Continue to promote partnerships between the community's high schools and post-secondary education providers to create an interconnected learning community.*

### ELEMENTARY AND SECONDARY EDUCATION

A system of elementary and secondary education will have been provided that meets the needs of the entire community by teaching basic skills and creativity/critical thinking, creating a sense of safety and belonging, and facilitating the school-to-life transition.

Partnerships will have existed between the City, the school district, businesses, higher education, community members, community groups, and arts groups.

***Guiding Principle 14A: Foster a system of elementary and secondary education that meets the needs of the entire community by teaching basic skills and creativity/critical thinking, by creating a sense of safety and belonging, and by facilitating the school-to-life transition.***

### Basic Skills

Goal 14A.1: Teach basic skills with parent, staff, and community support.

Objective 14A.1.2: Demonstrate proficiency on alternative assessments beyond CSAP and become successful lifelong learners.

### Safety and Sense of Belonging

Goal 14A.3: Create an educational environment that promotes safety and a sense of belonging

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*Objective 14A.3.4: Encourage the community to accept the responsibility for developing the means by which each child will arrive at school ready to learn.*

### School-to-Life Transition

Goal 14A.4: Facilitate school-to-life transition through school-to-life education programs.

### Educational Facilities

Goal 14A.5: Provide the elementary and secondary education community facilities desirable and necessary to support the existing and future land use patterns and the overall needs of the community.

*Objective 14A.5.6: Consider neighborhood standards and character when planning school sites.*

*Objective 14A.5.8: Promote safe walking routes to schools by working with appropriate agencies.*

*Objective 14A.5.9: Explore opportunities to co-locate and share facilities with the City, other educational institutions, corporations and non-profit groups.*

### POST-SECONDARY AND CONTINUING EDUCATION

A wide range of post-secondary and continuing education opportunities will have been developed that meet the academic, career technical, and lifelong education needs of the entire community.

***Guiding Principle 14B: Foster the development of post-secondary education opportunities that meet the academic, career technical, and lifelong education needs of the entire community.***

### Lifelong Learning

Goal 14B.4: Maintain and foster community and lifelong learning opportunities for the personal enrichment of Loveland's citizens.

*Objective 14B.4.1: Promote the offering of a wide variety of lifelong learning opportunities in the arts, music, culture, sports, recreation, and other areas of personal enrichment.*

### Expanded Educational Opportunities

Goal 14B.5: Expand educational opportunities to address gaps in the community's current education provision and meet future needs.

### Programs and Activities

Goal 14C.3: Provide a diverse collection of resources, services, and activities that inform, educate, entertain, culturally enrich, bridge the past to the future, and connect one community resource with another.

### IMPLEMENTATION PROGRAM

The community recognizes that all levels of government, along with the nonprofit and private sectors, will have played an important role in creating and implementing those policies and strategies that support the responsible growth and development of the community.

All plan elements will have been updated and readopted on a schedule such that no plan element will have been more than five years old.

The City will have continuously monitored the community's quality of life through the evaluation of a core set of community indicators. New policies and programs will have been instituted, and existing ones will have been modified in response to this indicator monitoring process.

***Guiding Principle 15: Recognize that all levels of government, along with the nonprofit and private sectors, play an important role in creating and implementing those policies and practices that support the responsible growth and development of the community.***

### General Plan Implementation

Goal 15.1: Achieve the goals and objectives, policies, and programs established in the Comprehensive Master Plan through both a short- and long-range program of implementation of specific public and private actions.

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*Objective 15.1.1: Include a Program of Implementation section in the General Plan Element that describes all public and private implementation tools available, or potentially available, to the community and how they are applied.*

*Objective 15.1.2: Include an Implementation Schedule in the General Plan Element that sets forth the responsibilities, costs, resources, and timeframes to accomplish the objectives contained in the Comprehensive Master Plan.*

*Objective 15.1.3: Ensure that all public implementation tools (codes, regulations, programs, etc.) and development-related processes are constantly monitored for their effectiveness and revised as necessary.*

### Plan Element Implementation

Goal 15.2: Ensure that each element of the Comprehensive Master Plan (the Plan) is consistent with the guiding principles, goals and objectives established in the General Plan; is updated in a timely fashion; is formally adopted in accordance with the City's approved adoption and amendment procedures; and contains an implementation schedule of actions to be taken.

*Objective 15.2.1: Recommend that all plan elements (except those noted as exceptions in the Plan) be adopted by the City Council in accordance with the approved amendment process.*

*Objective 15.2.2: Ensure that individual plan element purpose statements, goals, objectives, strategies, policies and programs are consistent with those in the General Plan.*

*Objective 15.2.3: Establish a consistent organizational framework for all adopted plan element documents, including purpose statements, goals, objectives, strategies, policies and programs and apply this framework when such plan elements are substantively amended.*

*Objective 15.2.4: Establish a consistent implementation schedule framework for all adopted plan element documents and apply this framework when such plan elements are substantively amended.*

### Community Indicators

Goal 15.3: Develop a core set of community indicators for the purpose of assessing the community's progress toward achieving the goals and objective contained in the Comprehensive Master Plan.

*Objective 15.3.1: Enhance the City's data gathering and evaluation capabilities through participation in the Larimer County COMPASS program.*

*Objective 15.3.2: Monitor community quality of life and community indicators using the City's annual community survey instrument and individual surveys conducted by departments, boards, commissions, and other agencies.*

*Objective 15.3.3: Establish a benchmark system for monitoring progress toward the goals and objectives contained in the General Plan.*

### Vision Statement 6

Loveland is a community that encourages active public involvement and is responsive to the health and human services needs of its citizens.

### COMMUNITY HEALTH PLANNING

Loveland will have remained a healthy community – a place where its citizens will have lived a healthy lifestyle, will have been well-informed about health issues, and will have access to quality preventive, medical, and mental health services.

Proactive neighborhood planning will have meant that neighborhoods remain walkable, active-living communities with an integrated system of trails. People will have been able to walk or bike to many destinations. Seniors, in particular, will have enjoyed walking for many daily errands or to visit friends. Youth will have remained able to get around town easily, with many still using a bicycle on safe paths to get to school.

**Guiding Principle 16: Ensure that Loveland is a healthy community whose citizens live a healthy lifestyle, are well-informed about health issues, and have access to preventive, medical, and mental health programs and services.**

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### Active and Safe Living

Goal 16.1: Encourage all citizens to lead an active and safe lifestyle by incorporating active and safe living concepts into land use, transportation, community facilities, and parks and recreation policies, guidelines, codes and regulations.

*Objective 16.1.1: Integrate active living concepts and pedestrian safety into transportation planning by implementing the pedestrian and bicycle components of the Transportation Master Plan and related policies found in other documents.*

*Objective 16.1.2: Continue to consider active living and pedestrian safety in land use planning and community design decisions.*

*Objective 16.1.3: Integrate active living concepts and pedestrian safety into the access to, design, and siting of community facilities, including school sites.*

*Objective 16.1.4: Continue to develop programs and activities that promote active living and enhance pedestrian and bicycle safety.*

### Programs and Activities

Goal 16.4: Continue to create and implement innovative preventive health and wellness programs.

*Objective 16.4.1: Create and support innovative preventive healthcare and wellness programs and partnerships that target health promotion, prevention, education, safety, wellness, and disease management for all ages and communities.*

### HUMAN SERVICES PLANNING

The needed network of human services and outreach will have been provided to ensure that all citizens, including special populations, will be able to achieve their full potential, and will be self-sufficient.

***Guiding Principle 17: Provide the needed network of human services and outreach to ensure that all citizens, including special populations, can achieve their full potential and be self-sufficient.***

### Community Belonging

Goal 17.3: Promote a sense of safety and belonging for all sectors of Loveland's community, particularly those limited or marginalized by age; by economic disadvantage or mental or physical health disabilities; by citizenship status, by gender and sexual orientation; or by cultural, educational or language barriers.

*Objective 17.3.2: Identify barriers to full participation in the community and access to amenities and services, including public transportation which makes access possible.*

### PUBLIC PARTICIPATION

Meaningful public participation processes that engage, empower, inform, and educate citizens will have encouraged community and stakeholder collaboration in the decision-making process.

The planning, design, and use of public facilities in 2030 will have been an increasingly community-driven process. Architects will have been able use software tools to show the city multiple possibilities, while allowing citizens to take a "virtual walk-through" and comment on what they see. As a result, the construction of public facilities such as plazas, parks, recreation centers, and transportation systems will have been more responsive to users' needs.

***Guiding Principle 18: Engage, empower, inform, and educate citizens through meaningful public participation processes that encourage community and stakeholder collaboration in the decision-making process.***

### General

Goal 18.1: Keep the Public Participation Plan current.

Objective 18.1.2: Continue to use the Public Participation Plan to inform public participation activities of individual departments.

### Community Engagement

Goal 18.2: Engage the public in active participation in planning-related initiatives.

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*Objective 18.2.1: Provide effective information to the public in a proactive, timely, clear, concise, visually appealing, and jargon- and acronym-free manner.*

*Objective 18.2.2: Involve a wide cross-section of the community through outreach efforts.*

*Objective 18.2.3: Involve citizens in all phases of the planning and/or plan update process so that they have a chance to give meaningful and informed input.*

*Objective 18.3.4: Seek opportunities for staff to join decision-makers when they formally engage the public in two-way communication.*

### Public Participation Tools

Goal 18.5: Maximize the use of those tools that allow for two-way communication between the public and city government.

*Objective 18.5.2: Use community surveys for citizen input and to monitor community indicators.*

## General Plan Appendix A: Compilation of Strategies and Policies

This City of Loveland's Comprehensive Plan Appendix contains a listing of strategies or policies that:

- should be considered for future use in a plan element/component that is not currently in place;
- was too discrete to be included as an objective; and/or
- would likely be implemented well beyond the General Plan's 10-year horizon.

The numbering system used below mirrors the one used in the organizational framework so that the strategies can be aligned with their respective guiding principles, goals, and objectives in future area and functional plan documents or updates.

*Strategy 3.3.1.5: Seek planning opportunities to connect the Downtown to the Big Thompson River.*

*Strategy 3.3.2.4: Seek opportunities for turning arterial roadways (such as US 402) into tree-lined boulevards through corridor planning and/or partnership with CDOT.*

*Strategy 3.3.4.6: Identify opportunities to create fully-accessible pedestrian networks, including sidewalks, trails, pedestrian pass-through connections, and safe street crossings in existing neighborhoods.*

*Strategy 3.3.5.2: Encourage a mix of uses within the area of transit station(s) and along major transit routes at a scale, intensity, and density that will produce a high level of pedestrian activity and reduce dependence on the automobile.*

*Strategy 3.3.5.3: Enhance the physical and aesthetic quality of the area surrounding the transit station(s), with specific attention given to the needs of pedestrian and transit users.*

*Strategy 3.3.5.4: Provide for increased and improved pedestrian circulation in the area of transit station(s) that encourage walking and bicycling as alternative forms of transit station access.*

*Strategy 3.3.5.5: Improve the ability of passengers to transfer easily between transportation modes.*

### PARKS AND RECREATION

*Strategy 6.3.1.1: Plan and create a secondary system of fully accessible soft-surface trails that link with partnership trails as trail corridors, resources, and priorities permit.*

*Strategy 6.3.1.2: Ensure that the Loveland trail system encircles the City, provides convenient access to many neighborhoods (residents), and connects recreational resources and areas of interest in the City and surrounding area.*

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### CULTURAL SERVICES

*Strategy 7.2.2.4: Assess the feasibility of a 5th street pedestrian plaza.*

### LOCAL TRANSPORTATION

*Strategy 10B.6.1.2: Engage in coordinated regional transportation demand management (TDM) marketing and education campaigns.*

*Strategy 10B.6.1.3: Encourage and support voluntary employer-based transportation demand management (TDM) programs.*

*Strategy 10B.6.1.4: Encourage local development of bicycle and pedestrian facilities and TDM-friendly land use planning.*

### COMMUNITY HEALTH PLANNING

*Strategy 16.1.1.1: Assess pedestrian and bicycle safety and make specific improvements to unsafe areas.*

*Strategy 16.1.1.2: Seek new funding sources for capital improvements that promote active living and pedestrian safety.*

*Strategy 16.1.1.3: Provide safe and convenient pedestrian access to all transit stops, using the concept of “pedestrian sheds” to assess pedestrian access.*

*Strategy 16.1.2.1: Incorporate fully accessible and unobstructed pedestrian ways into planning for residential neighborhoods and commercial developments, using the concept of “pedestrian sheds” to assess pedestrian access.*

*Strategy 16.1.2.2: Accommodate persons with disabilities and citizens of all ages through appropriate design of traffic crossing signals and pedestrian facilities.*

*Strategy 16.1.3.1: Incorporate fully accessible and unobstructed pedestrian ways into school facilities planning through cooperation between the Thompson R2-J School District and the City.*

*Strategy 16.1.3.2: Promote safe walking routes to schools by working with appropriate agencies, including the Thompson R2-J School Board.*

*Strategy 16.1.3.3: Provide persons with disabilities easy and unobstructed access to sidewalks, crosswalks, parking lots, streets, parks, restrooms, and other public and private facilities.*

### City of Loveland Transportation Plan

The City developed the Transportation Plan with citizen input on specific goals. Developing a shared vision for the future and the transportation system necessary to support that vision was an essential step in the planning process. The goal statements are a verbal expression of each aspect of the vision for the future. The following are the Transportation Plan’s goals associated with bicycle and pedestrian modes of transportation.

### Transportation Plan Goals

Recognize the important relationship between land use and transportation and develop appropriate policies that promote a long-term sustainable transportation system.

Plan a safe, efficient, continuous, coordinated and convenient multi-modal transportation system that serves the needs of the community now and establishes the foundation for a transportation system that is sustainable for future generations.

Develop transportation plans and policies that recognize the importance and value of the physical environment.

Develop transportation plans that sustain the economic vitality of the community consistent with the Loveland Comprehensive Master Plan.

Develop street access policies that balance the needs of property access with safety, community mobility, and street capacity.

Develop long-term travel demand management policies that will allow the street system to maintain acceptable service levels far into the future.

Investigate all reasonable funding strategies and develop a plan and an implementation strategy that recognizes current funding realities and limitations.

### Bicycle & Pedestrian/TDM Strategic Plan

Defining the City of the future for multi-modal transportation is essential to building an interconnected network for bicycle and pedestrian transportation. This plan will revisit the model utilized to define how and where facilities are placed, the cost to upgrade the existing system to that standard and a plan for implementation.

To analyze existing conditions and evaluate improvements, six measurements are considered when planning or evaluating a pedestrian system. The Pedestrian Plan calls for the continued upgrade of existing pedestrian areas through existing sidewalk replacement policies, enhancement funds, and a percentage of the street capital budget. Future pedestrian facilities will be funded primarily through development activity, as new development proposals will be held to the standards adopted under the City's codes, standards and policy statements. This ensures that the minimum acceptable service for each type of pedestrian district is attained during construction.

# Appendix B |

## Pedestrian and Bicycle Best Practices

Since the original Intermodal Surface Transportation Efficiency Act of 1991, progressive communities across the United States have embraced the directive to include, to a greater extent, pedestrian and bicycle mobility in the planning process. As a result, there have been significant efforts toward re-looking at pedestrian and bicycle standards and guidelines.

This document represents a compilation of the standards and guidelines of the member jurisdictions and best practices from jurisdictions across the country. It includes a review of Complete Street requirements as required by FHWA, best practices in pedestrian and bicycle facilities planning, and a discussion on travel demand management.

The Pedestrian and Bicycle Guidelines are intended as recommendations for member jurisdictions to improve bicycle and pedestrian mobility. Member jurisdictions are not required to adopt these guidelines; but rather, to use them as a planning tool in developing pedestrian and bicycle plans for their local communities. The guidelines are intended to be flexible to allow for implementation, as appropriate.

### Complete Streets

In 2000, the Federal Highway Administration (FHWA) provided the following guidance: “**Bicycling and walking facilities will be incorporated into all new transportation projects unless exceptional circumstances exist.**” Since then, cities and counties throughout the country have started working toward providing “complete streets” in their communities. A complete street is one that works for all travel modes, including motorists, transit, bicyclists, pedestrians, and wheelchairs. A complete street policy ensures that the entire right-of-way is routinely designed and operated to enable safe access for all users. In keeping with the “complete streets” philosophy, the following outlines some general guidelines or “best practices” for creating “complete streets” and accommodating bicyclists and pedestrians within roadway corridors.

### Complete Street Guidelines

#### FEDERAL GUIDANCE

In 2003, FHWA published *Design Guidance Accommodating Bicycle and Pedestrian Travel: A Recommended Approach* (Guidance), a policy statement to guide jurisdiction in integrating bicycling and walking into their transportation systems. The Guidance establishes the following four policies:

1. Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more conditions are met:
  - Bicyclists and pedestrians are prohibited by law from using the roadway;
  - The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use (*i.e.*, >20%); and
  - Where a sparse population or other factors indicate that there is no need.
2. In rural areas, paved shoulders should be included in all new construction and reconstruction projects on roadways used by more than 1,000 vehicles per day.
3. Sidewalks, shared use paths, street crossing, pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated, and maintained so that all pedestrians, including people with disabilities, can travel safely and independently.
4. The design and development of the transportation infrastructure shall improve conditions for bicycling and walking through the following additional steps:

## Appendix B | Pedestrian and Bicycle Best Practices

- Planning projects for the long-term;
- Addressing the need for bicyclists and pedestrians to cross corridors as well as travel along them;
- Getting exceptions approved at a senior level; and
- Designing facilities to the best currently available standards and guidelines.

It should be noted that exemptions to the complete streets requirement require exceptional reasons and facilities with federal funding require FHWA approval of the exemption. A state or local agency could be put on probation for receiving additional federal funds, if the FHWA finds inappropriate use of exemptions to exclude accommodation of all modes.

### LOCAL IMPLEMENTATION

Many jurisdictions are amending their street standards to include a recommendation promoting “complete streets.” A suggested description is as follows:

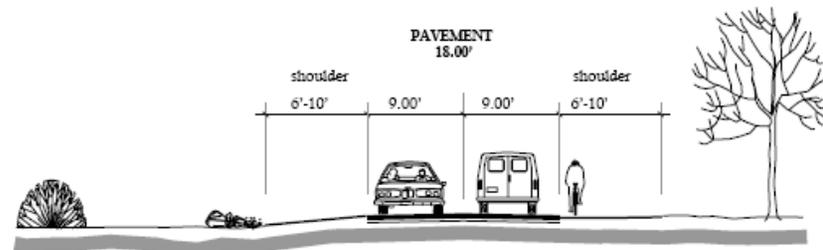
*“Construct complete streets designed to accommodate all users. In all new roadway projects or major reconstruction projects, accommodate travel by pedestrian, bicyclists, and transit users, except where pedestrians and bicyclists are prohibited by law from using a given facility or where construction of bikeways or walkways would be unsafe or impractical. Such facilities for pedestrian and bicycle use shall be designed to the best currently available standards and guidelines.”*

### COMPLETE STREET DESIGN

While the definition of a complete street is universally applicable, the design of complete streets is variable. Each street has unique characteristics that make it distinctive from another. Therefore, **a complete street in a rural area will look quite different from a complete street in a highly urban area.** However, both streets are designed to balance safety and convenience for everyone using the road.

Elements that may be found on a complete street includes: sidewalks, bike lanes, crosswalks, wide shoulder, medians, bus pullouts, special bus lanes, raised crosswalks, audible pedestrian signals, sidewalk bulb-outs, and more. The following outlines the characteristics of “typical” complete streets in an urban and rural setting.

- **Rural.** Rural roadways provide unique design challenges to develop complete streets. Rural streets typically have low traffic volume and the traffic lanes serve as multi-modal pathways often accommodating pedestrians, bicyclists, and motorists. These types of streets typically lack sidewalks and few pedestrians use these routes. Streets may be striped in order to provide the best use of the right-of-way and not limit mobility. Rural complete streets provide adequate shoulders (at least 5 feet) for use by bicyclists. Ideally, the shoulder should be 8 feet wide to allow a vehicle to pull off the roadway in an emergency.



## Appendix B | Pedestrian and Bicycle Best Practices

- **Urban.** Urban streets are utilized to access mixed use and commercial areas. These streets typically carry a higher volume of traffic and have more pedestrians and bicyclists present. Transit is an active component of these areas and intermodal connections are prioritized.

There are many different types of streets found in urban settings. Recommended standards for different types of urban streets are outlined below. These standards include provisions for narrow street widths where low speeds are appropriate, detached sidewalks, bicycle facilities, and shorter block lengths.

### Local Streets

- The maximum width of local residential streets is 30-32 feet (two 7-foot parking lanes and two 8-9 foot travel lanes) depending on the expected travel volume.
- Landscape strips, separating curb from the sidewalk, are required on local residential streets.
- Maximum block length is 600 feet for low-volume residential streets and 800 feet for medium-volume residential streets.
- 6-inch vertical curbs are required.

### Collector Streets

- Landscape strips, separating curb from the sidewalk, would be required on most new streets.
- Maximum block length is 1,000 feet for collector streets.
- Streets with on-street parking bulbouts are encouraged at intersections to reduce the crossing distance for pedestrians and discourage speeding through intersections.
- Roundabouts should be considered where residential streets intersect and ultimate combined volume will exceed 1,000 vehicles daily or where the unimpeded

distance on any of the approaches not subject to stop control exceeds 600 feet.

- Bicycle lanes should be provided on all collector streets.



### Arterial Streets

- Bulbouts would be encouraged at some intersections to reduce the crossing distance for pedestrians and discourage speeding through intersections.
- Maximum block length is 1,320 feet (four intersections per mile). This could be lengthened if bike/ ped paths were provided that shortens the effective block length for non-auto users.
- Raised medians with turn pockets should be provided.
- Bicycle lanes should be provided on all arterial streets.



## **Pedestrian Facilities**

Walking is the fundamental mode of human mobility. Everyone is a pedestrian at some point in every journey that they take, including walking to a bus or walking to a parking lot. It includes people of all ages, from children to older adults, as well as pedestrians with visual and mobility impairments. Unfortunately, many of our streets and highways were primarily built to facilitate the smooth flow of motor vehicles. People should be able to walk safely, whether for fun and recreation, errands, getting to work or schools, shopping or other reasons. The following provides recommended standards and guidelines for facilitating pedestrian access and increasing pedestrian safety on local roadways.

### **Sidewalks and Walkways**

Sidewalks are integral to the transportation system. Safe, convenient, accessible pedestrian sidewalks and access should be provided on all new streets within an urban/suburban setting. At a minimum, sidewalks should be provided along all streets used for pedestrian access to schools, parks, shopping areas, and transit stops.

To the extent feasible, pedestrian traffic and those using wheelchairs should be separated from vehicle traffic. Where complete separation of pedestrians from vehicles and bicycles is not possible, potential hazards should be minimized by using techniques such as special paving, pavement marking, signs, striping, bollards, median refuge areas, traffic calming features, landscaping, lighting, or other means to clearly delineate pedestrian areas day and night.

Some effective pedestrian safety measures may increase motor vehicle travel time and have a slight negative impact on motor vehicle level of service (LOS). A rebalancing of the transportation system where pedestrian LOS and safety are included may sometimes mean a change in expectation about the priority that motor vehicle LOS is given in design and decision-making. If serious safety measures are to be achieved, the particular LOS may be lower for motor vehicles than if those measures were not taken.

Development plans should include site amenities that enhance safety and convenience, and promote walking or bicycling as alternative means of transportation. Site amenities may include bike racks, drinking fountains, canopies, and benches.

### **STANDARDS AND SPECIFICATIONS**

Sidewalks should be provided for any portion of a site that abuts a roadway. All sidewalks should be in the public right-of-way. Sidewalk width will be specified per each jurisdiction's design standards. Both the FHWA and the Institute of Transportation Engineers (ITE) recommend a minimum width of five feet for a sidewalk or walkway, which allows two people to pass comfortably or to walk side-by-side. A buffer zone of four to six feet is desirable and should be provided to separate pedestrians from the street. Parked cars and/or bicycle lanes can provide an acceptable buffer zone.

When a sidewalk abuts angled parking such that there will be vehicular overhang, the sidewalk should be a minimum of six feet in width.

Where there is adequate right-of-way, the construction of the sidewalk should be separated from the curb and gutter section for all arterials and collectors; this separation is also recommended for subdivisions. The area between the sidewalk and the back of the curb should be appropriately landscaped.

Sidewalk construction and removal should be in accordance with the local jurisdictions' Construction Standards and Specifications.

### **ACCESSIBILITY GUIDELINES**

Sidewalks, walkways, and driveways should be constructed in accordance with the Americans with Disabilities (ADA) Accessibility Guidelines. Curb ramps should be provided wherever an accessible route crosses a curb (ADA Accessibility Guidelines). Driveways should be constructed in accordance with ADA Accessibility Guidelines so that the sidewalk can be negotiated by a wheelchair.

### **RESPONSIBILITIES**

The builder on the lot is responsible for sidewalk construction. Where sidewalks are not directly related to a lot, the construction of sidewalks is the responsibility of the developer. A Certificate of Occupancy will not be issued until required sidewalks are constructed and approved.

### Techniques for Accommodating Pedestrians

The parking and circulation system within each development should accommodate the movement of vehicles, bicycles, and pedestrians throughout the proposed development and to/from surrounding areas, safely and conveniently. The system should provide adequate directness, continuity, and street crossing. Walls, fences, and barricades should not restrict access to adjacent uses, particularly for public uses such as schools, parks, and recreational areas.

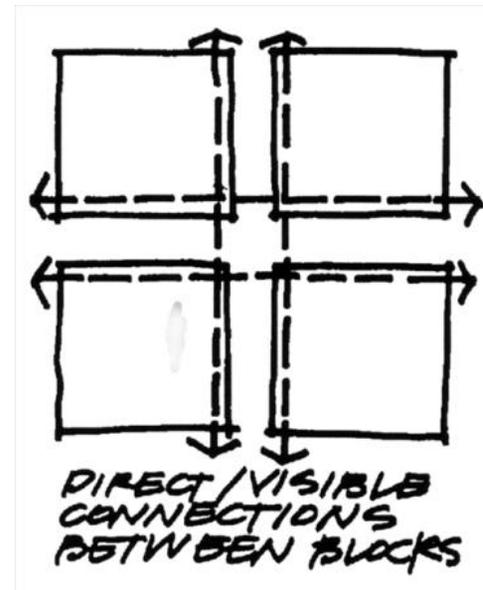
To the maximum extent feasible, the following guidelines should be incorporated into the design of all new developments to ensure safe and convenient pedestrian access into and within the site, with minimum potential for conflict with motor vehicles. These design elements complement the five measures of pedestrian level of service: Directness, Continuity, Street Crossings, Visual Interest and Amenity, and Security.

#### DIRECTNESS

Sidewalks within the site should be located and aligned to directly and continuously connect areas or points of pedestrian origin and destination, and should not be located and aligned solely based on the outline of a parking lot configuration that does not provide such direct pedestrian access. To the maximum extent feasible, walkways and bicycle connections should provide the most direct access route between intended points of travel.

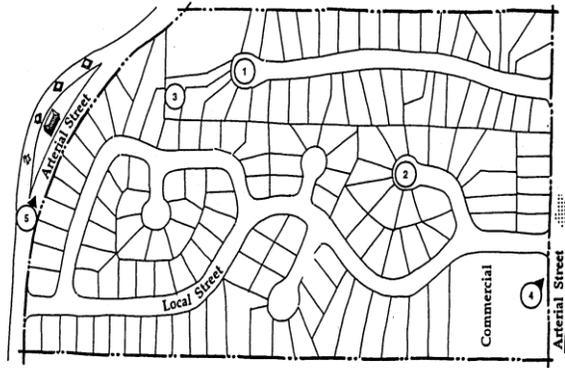
- **Visible Connections.** Provide visible connections to key pedestrian destinations. Align and locate buildings, roadways, and open space so that pedestrians can see their destinations before arriving there. Minimize and remove physical obstructions/barriers that impede direct pedestrian access.
- **Building Entries.** Provide clearly marked building entries that can be viewed from the street. Entries from parking lots should be subordinate to those related to the street. Buildings should be sited in ways to make their entries or intended uses clear to pedestrians. Provide clear and direct pedestrian entries from the street, not just from parking areas.

- **Development Patterns.** The location and pattern of streets, buildings, and open space must facilitate direct pedestrian access. Locate buildings near street corners to improve access to bus stops and provide pedestrian connections to neighboring activities. Establish appropriate lot patterns that provide direct and visible connections of sidewalks between blocks and between cul-de-sacs. Offer more route choices along quiet local streets. The following exhibits provide examples of typical developments as compared to developments with pedestrian compatible improvements. These examples illustrate the same development yield for the site, illustrating that good pedestrian connections and development opportunities are compatible and efficient.
- **Lighting.** Use light fixtures to provide direct indication for pedestrian traffic.
- **Accessory Uses.** Ensure that sidewalk uses such as outdoor cafes, in high-use retail pedestrian settings, are compatible with direct pedestrian access to buildings and other destinations.

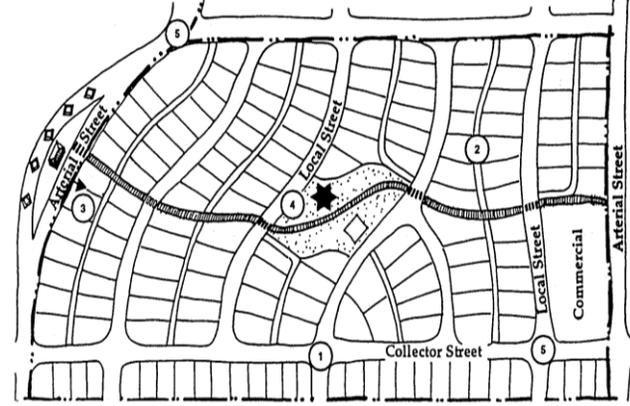


# Appendix B | Pedestrian and Bicycle Best Practices

## Residential

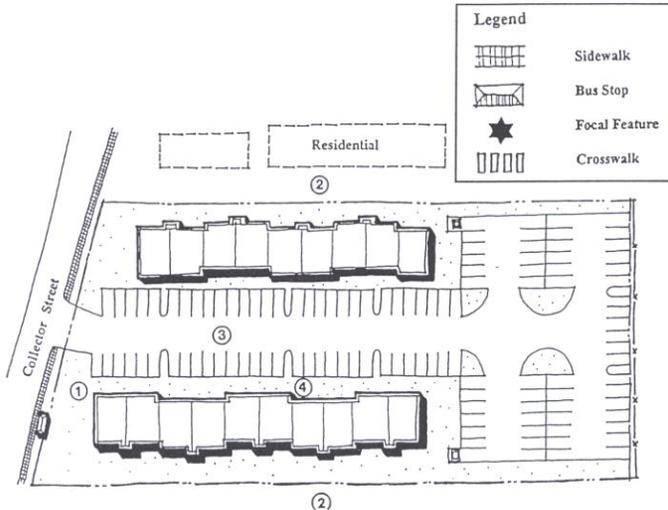


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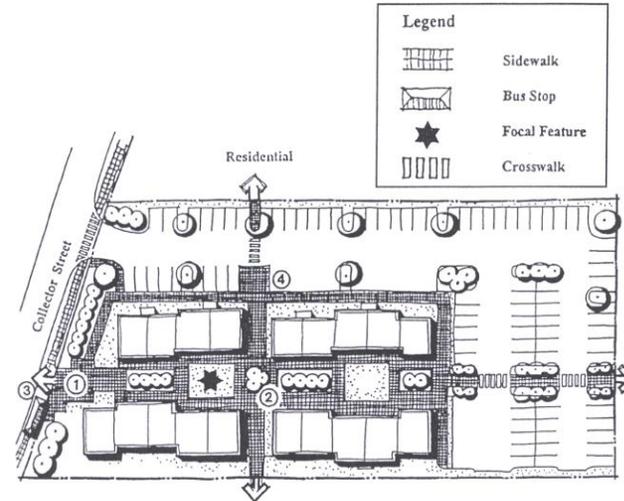


Pedestrian Compatible

## Residential Apartment



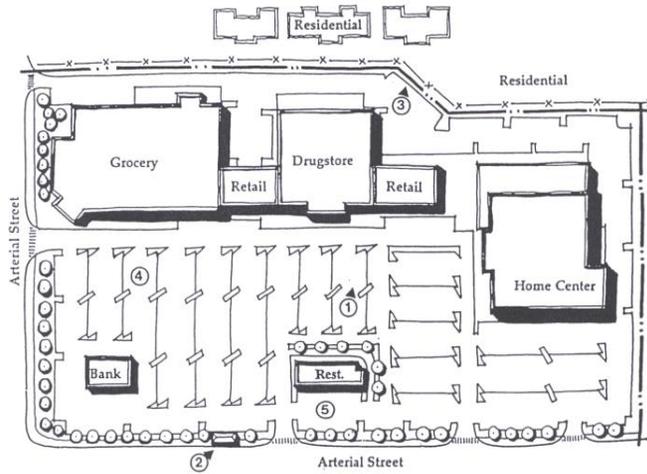
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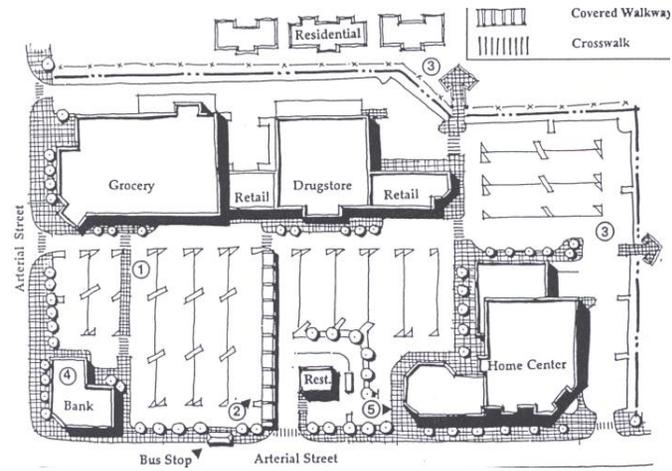
Pedestrian Compatible

# Appendix B | Pedestrian and Bicycle Best Practices

## Commercial Retail Shopping Center

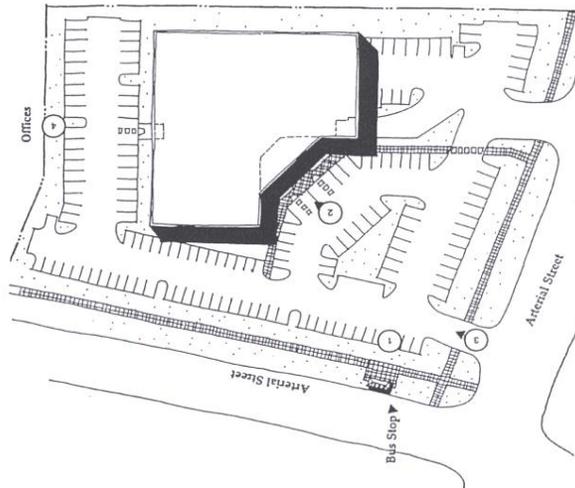


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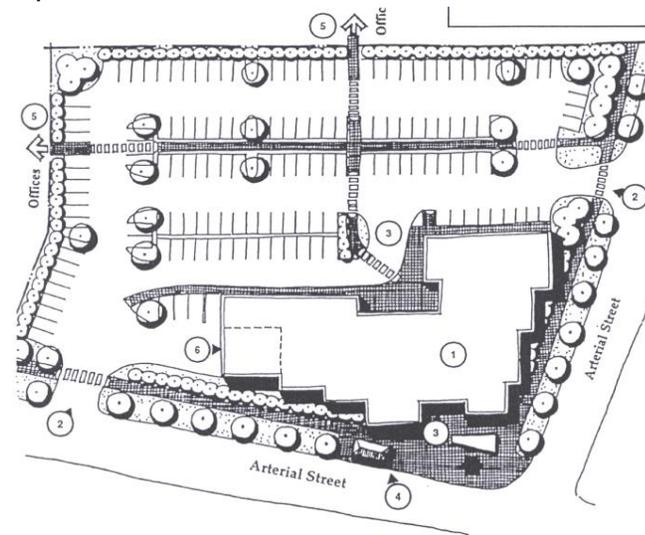


Pedestrian Compatible

## Office Development



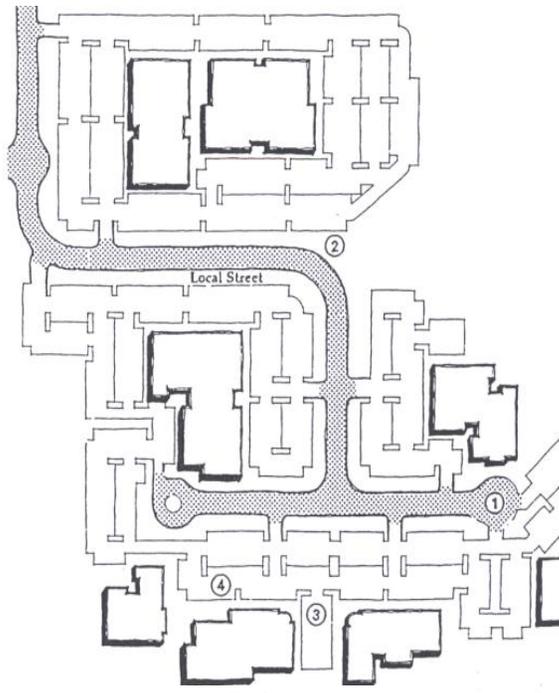
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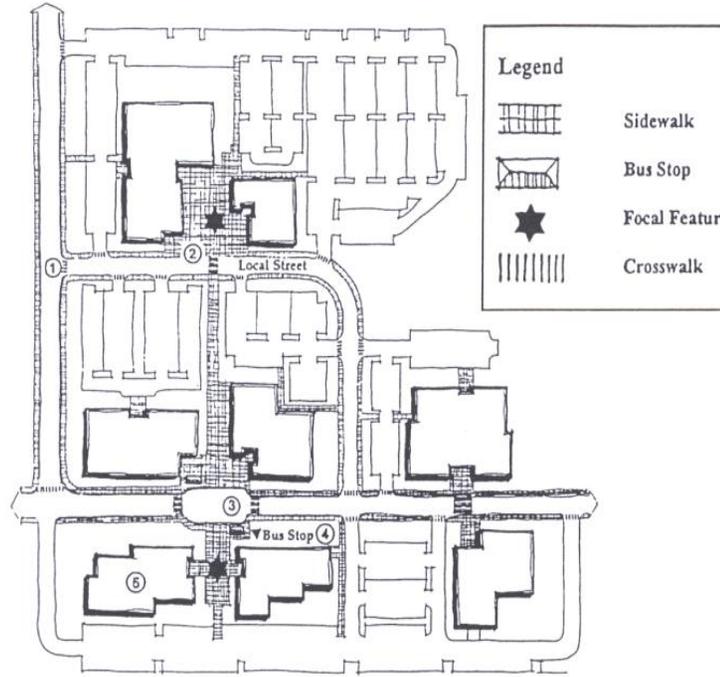
Pedestrian Compatible

# Appendix B | Pedestrian and Bicycle Best Practices

## Office/Industrial Park



Typical



Pedestrian Compatible

Legend

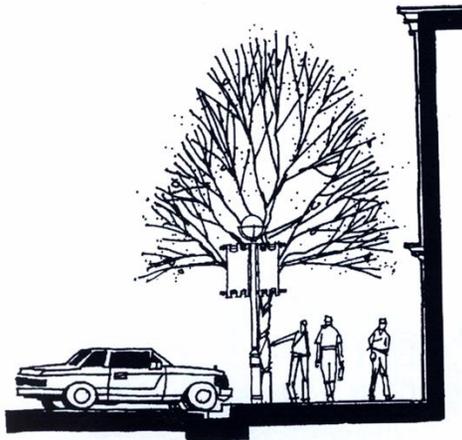
- Sidewalk
- Bus Stop
- Focal Feature
- Crosswalk

## Appendix B | Pedestrian and Bicycle Best Practices

### CONTINUITY

Sidewalks should provide a continuous and understandable pedestrian network that links schools, neighborhoods, parks, activity centers, and other destinations. In order to provide a continuous pedestrian network to destinations, the local jurisdiction may require additional sidewalks, walkways, or bike paths not associated with a street, or the extension of a sidewalk from the end of a cul-de-sac to another street or walkway and connections between developments. When necessary to assure the public's safety in using on-site or connecting pedestrian sidewalks, the jurisdiction may require a developer to provide on-site or off-site pedestrian overpasses, underpasses, or traffic signalization.

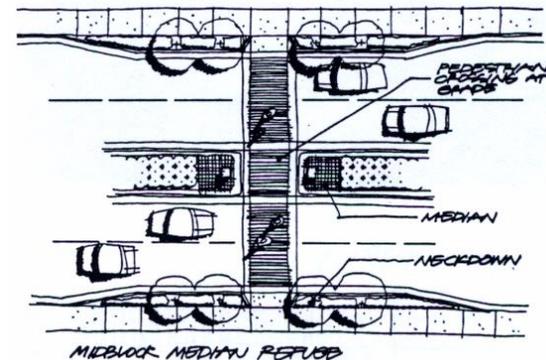
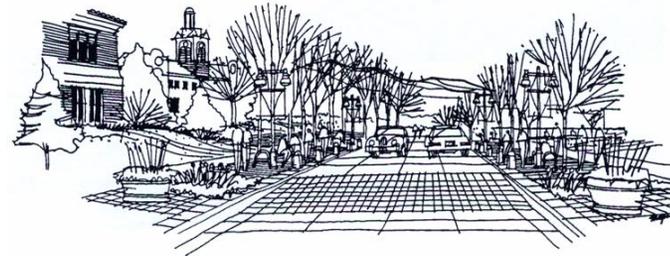
- **Design Elements.** Consistent design can help to create a uniform, readily identifiable pedestrian network. Incorporating the following facilities, measures, and elements can provide a uniform, continuous pedestrian network:
  - Continuous sidewalks on both sides of the street;
  - A continuous alignment of building facades near the sidewalk;
  - A consistent park strip between the curb and the sidewalk; and
  - Consistent street trees.



- **Accessory Uses.** Ensures that sidewalk cafes and other uses/features of the sidewalk area support rather than obstruct a continuous pedestrian network.
- **Bridges and Overcrossings.** Provide bridges and crossings over railroads, rivers, drainages, and other features that are major barriers to a continuous pedestrian network. Design these crossings to minimize out of direction travel.

### STREET CROSSINGS

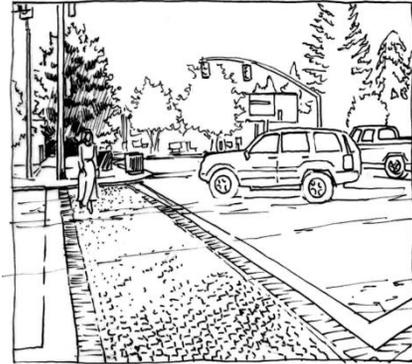
Jurisdictions should develop safe, comfortable, and attractive street crossings. Intersections crossing multiple lanes require pedestrian enhancements. If it is determined that the traffic demand warrants additional through or turn lanes, then pedestrian mobility should be evaluated to determine whether or not additional pedestrian enhancements should be required to offset the traffic impacts on the pedestrian.



## Appendix B | Pedestrian and Bicycle Best Practices

- **Roadway Design.**

Design roadways to improve the safety and comfort of arterial street crossings. The greater the number of lanes that a pedestrian must cross, the greater is the pedestrian's exposure to vehicles. In addition, wider streets tend to carry higher volumes of traffic and higher speeds. Consider the following roadway design elements:



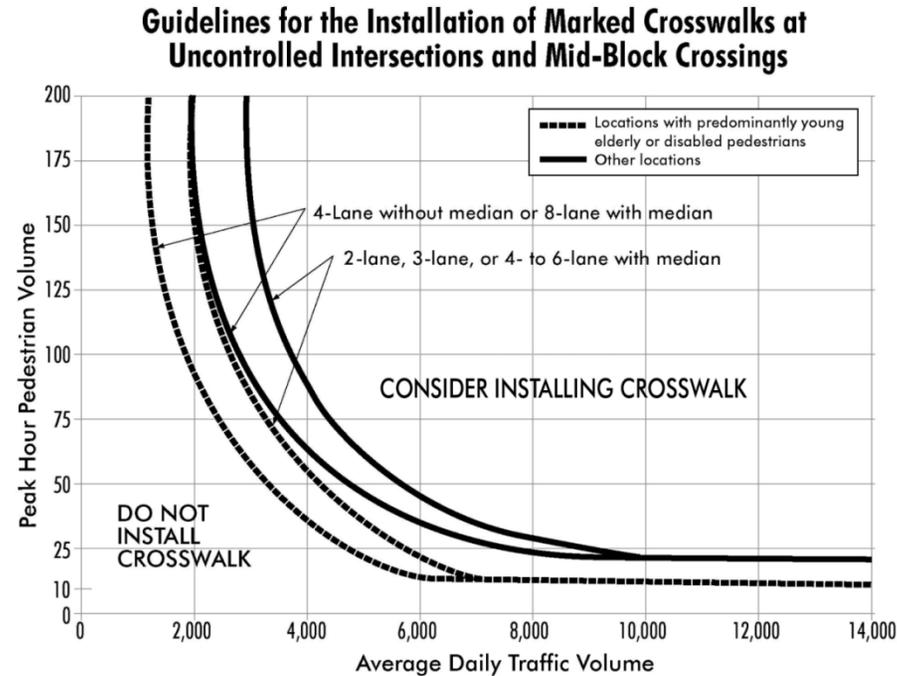
- **Number of Lanes.** The number of travel lanes to cross is a significant safety factor for a pedestrian crossing the street. When the number of travel lanes increase, it is generally in response to higher traffic volumes. In addition, the pedestrian is exposed for a longer period of time in crossing those additional lanes.
- **Lane Widths.** Typically, a travel lane is 12 feet wide. If the lane width is reduced, the time it takes a pedestrian to cross is also reduced. In addition, the narrower travel lane tends to calm or slow traffic, which is a benefit to the pedestrian.
- **Parking Lanes.** When parking lanes exist along the street, the pedestrian walk times to cross the street increase as the pedestrian must first cross the parking lane before beginning to cross the traffic lanes. At intersections, vehicles that make wider, higher speed turns often use these parking lanes.
- **Travel Speed.** Speed is a significant safety factor for pedestrians trying to cross a street. Factors that might affect speed include minimum cross street traffic, low number of access points, and geometric design. As mentioned previously, lane widths also contribute to travel speeds.

- **Crosswalks.** Design crosswalks to create safe crossings for pedestrians. The location and frequency of crosswalks along primary arterials, secondary arterials, and collector streets need to be balanced between need, traffic flow, and cost. Whereas an optimum pedestrian environment would have crosswalks at all major activity areas and spaced at 400-foot increments, too great a frequency of crosswalks can create a situation where the typical driver becomes immune to the crosswalk, which might create a safety hazard. The following should be taken into account when considering locations for crosswalks:

- All signalized intersections with ADA-accessible pedestrian activated push buttons;
- Locations that will attract high volumes of pedestrian traffic;
- Locations for safety, such as crosswalks to school sites, transit stops or activity areas; and
- Mid-block crossings at a minimum of 350 feet from adjacent intersection crosswalks.

In areas that have high volumes of pedestrians crossing a street, pedestrian crosswalks should be installed. The need for these crosswalks is a function of roadway type and pedestrian volumes. Roadway types from collector to primary arterial result in more travel lanes to cross in which the pedestrian is exposed, higher traffic volumes, and often increased traffic speeds. The chart and table below is a guideline as to where unprotected intersection and mid-block crosswalks should be considered based on street width/type and pedestrian volumes.

## Appendix B | Pedestrian and Bicycle Best Practices



Source: Smith and Knoblauch, AAA Transportation Research Record 1141 as reprinted in the ITE manual, Design and Safety of Pedestrian Facilities

### GUIDELINES FOR INSTALLING MARKED CROSSWALKS

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT > 9,000 to 12,000			Vehicle ADT > 12,000 to 15,000			Vehicle ADT > 15,000		
	Speed Limit											
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
2 Lanes	C	C	P	C	C	P	C	C	N	C	P	N
3 Lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multi-Lane (4 or more lanes) with raised median	C	C	P	C	P	N	P	P	N	N	N	N
Multi-Lane (4 or more lanes) without raised median	C	P	N	P	P	N	N	N	N	N	N	N

Source: FHWA 2006

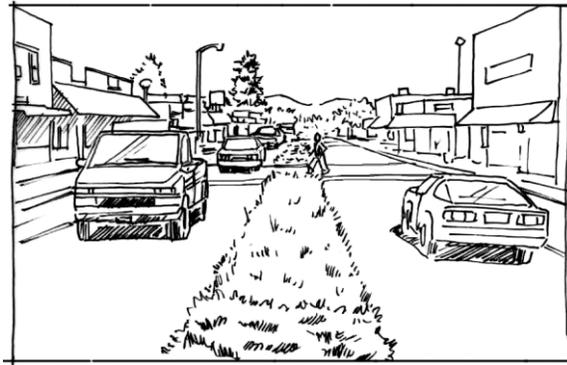
C = Candidate for marked crosswalks.

P = Possible increase in pedestrian crash risk may occur if crosswalk markings are added without other pedestrian facility enhancements.

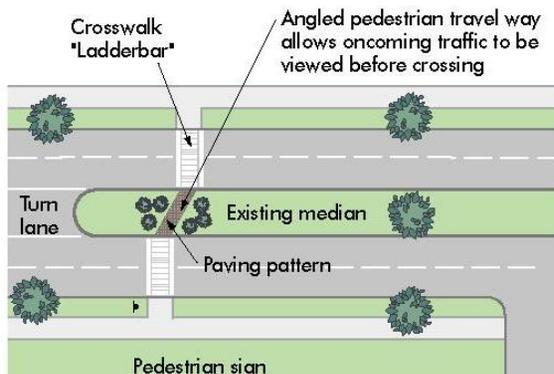
N = Marked crosswalks alone are insufficient and pedestrian crash risk may increase when providing marked crosswalks alone. Consider using other treatments, such as traffic signals with pedestrian signals where warranted or other substantial crossing improvements to increase crossing safety.

## Appendix B | Pedestrian and Bicycle Best Practices

- Mid-Block Crossings.** Mid-block crossings should be provided where there is an existing or potential pedestrian demand to cross at higher volume roadways or streets where crossings are greater than 800 feet. Ideally, these crossings should be accommodated with a refuge island. Where mid-block crosswalks are installed at uncontrolled locations (i.e., where no traffic signals or stop signs exist), crossing islands should be considered as a supplement to the crosswalk in order that the pedestrian will only cross one lane at a time. Providing an angled pedestrian travel way across the median allows oncoming traffic to be better viewed before crossing, further improving safety.



- Median Refuge Areas.** Painted medians offer little refuge other than getting the pedestrian out of a lane of traffic. Substantive raised medians of significant width with a cut through provide some increase in security for the crossing pedestrian. For arterials with four or greater lanes, a raised median refuge island should be designed for all intersections and mid-block crossings. Center crossing islands allows the pedestrian to deal with only one direction of traffic at a time, and they enable them



to stop partway across the street and wait for an adequate gap in traffic before crossing the second half of the street.

- Signs and Signals.** Pedestrian signal heads should be included for all signalized intersections with crosswalks and the heads should be easily visible to the pedestrian. It would be desirable for all activity areas to have designated pedestrian walk phases. Pedestrian push buttons should be required for all other intersections. The location of the push button should be easily accessible and not require pedestrians to divert from their travel route. Signals without dedicated walk phases or push buttons are not acceptable since the only way a pedestrian may ever get a green light is when an automobile on the side street activates the cycle.



Countdown Signal Head

At signal locations that experience a high number of pedestrians, such as at transit stops or universities, have experienced a large number of pedestrian accidents, or any other area where pedestrians often cross during the “Do Not Walk” phase, countdown signal heads should be considered to provide additional information about how much time is remaining for being able to cross the street.

- Lighting Levels.** The intersection should be well lit so that the pedestrian is visible at night. Ensure that street crossings are lit to reflect the patterns of use.
- Amenities.** In pedestrian districts, amenities should include such elements as signage and design features that strongly suggest the presence of a pedestrian crossing. Enhancements to crosswalks including color, stenciling, and pavement treatments should be considered for all major intersection entryways to mixed-use centers. Develop civic improvements including pedestrian scale elements, landscaping, and sidewalk

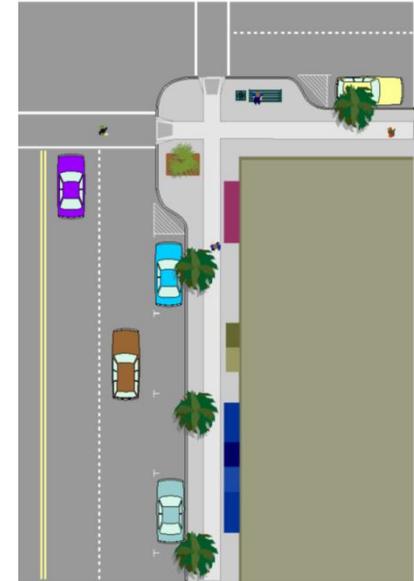
## Appendix B | Pedestrian and Bicycle Best Practices

widenings which improve the visibility and suggestion of pedestrians at street crossings.

- **Line-of-Sight Distance.** Sight distance measures the unobstructed view between the motorist and the pedestrian. This can be a problem, particularly when a motorist intends to make a left-turn under the permissive left-turn phase, and it is difficult to see pedestrians around the opposing left-turn vehicle. Sight distance should be analyzed as a part of all intersection designs.
- **Right-Turn on Red (Left-Turn on Red on One-Way Streets).** One of the greatest increases in pedestrian accidents has been associated with right-turns on red lights. Research has determined that an extremely high number of drivers do not stop at the crosswalk before making their turn and instead, continue on while looking to the left for approaching conflicting vehicles, not pedestrians in the crosswalk. Some jurisdictions have installed signs that do not permit right-turns on red in specific places and circumstances in order to improve safety for crossing pedestrians.
- **Bulbouts/Curb Extensions.** In special applications, the City or developer may consider bulbouts to reduce traffic speed and to improve pedestrian safety. Bulbouts are simply intersection curb extensions, which extend past the parking lanes, but not into the bicycle or through lanes. The advantages of bulbouts are as follows:
  - Bulbouts provide an entry or gateway statement into activity areas or where high volumes of pedestrians are present. Entering an area where a bulbout is present provides a clear difference between the arterial function and a local pedestrian activity area.
  - Bulbouts enhance the visibility of the pedestrian because they physically permit the pedestrian to be located closer to the travel lanes, especially where parking is permitted, and allow the pedestrian to be seen more easily by the driver.
  - Bulbouts constrict traffic flow through reduced lateral clearance. This reduction effects a reduction in travel speed

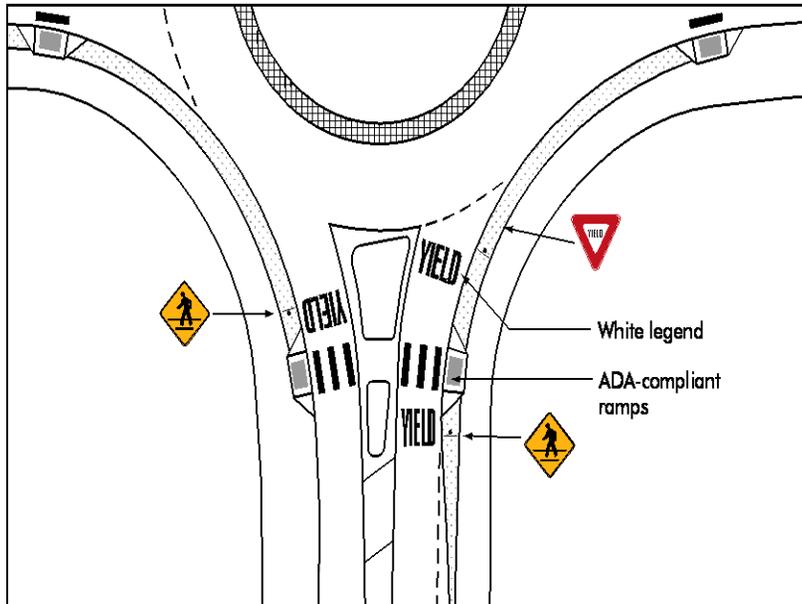
along the corridors and improves safety for both pedestrians and vehicles.

- The bulbout changes the turning radius at the intersection, which reduces turning speed and vehicle and pedestrian conflicts.
- The extension of the bulbout reduces the time it takes pedestrians to cross from curb to curb. This reduction in pedestrian crossing time consequently reduces the time the pedestrian is exposed to moving vehicles.
- Bulbouts change the character of the intersection from automobile-dominant to pedestrian-friendly and multimodal-shared.
- Bulbouts can be an extremely positive visual and aesthetic enhancement. Features such as pedestrian lighting, planters, and benches create a focal point for pedestrian activity and change the character of the intersection from automobile to pedestrian. It should be noted that care must be taken when aesthetically enhancing bulbouts as such enhancements can block sight distances and create accident problems.
- **Modern Roundabouts.** The use of modern roundabouts as an alternative to conventional stop and signal control intersections is becoming increasingly popular in the United States. Studies conducted by the insurance industry have determined that these types of intersections result not only in a significant decrease in automobile traffic at an intersection, but also a reduction in pedestrian accidents as well.



## Appendix B | Pedestrian and Bicycle Best Practices

Modern Roundabout Pedestrian Crosswalk Treatment



At a conventional intersection, the pedestrian faces four (4) potential vehicle conflicts:

1. Crossing movements on red (typically high-speed, illegal);
2. Right-turns on green (legal);
3. Left-turns on green (legal for protected-permitted or permitted left-turn phasing); and
4. Right-turns on red (typically legal).

Pedestrians at roundabouts, on the other hand, face two (2) conflicting movements on each approach:

1. Conflict with entering vehicle; and
2. Conflict with exiting vehicle.

The crossing of the roundabout is relatively simple. The pedestrian waits for a gap in traffic and crosses from the curb to the splitter island that provides protection, and then crosses from the splitter island to the far curb when a gap in traffic occurs. Crossing in two

steps reduces the vehicle exposure in half for each segment. In addition, safety is improved because the vehicles are forced to go slower through the roundabout than at a conventional intersection. The modern roundabout pedestrian crosswalk treatment consists of:

- ADA Compliant Ramps;
- Conventional Crosswalk Striping;
- Raised Splitter Island Pedestrian Pass Through and Refuge;
- Pedestrian Crossing Sign;
- Yield Street Markings; and
- Yield Signs.

Typically, the crosswalk is placed approximately one car length from the yield bar to permit the pedestrian to safely walk behind a vehicle that is awaiting a merge into the roundabout when traffic permits.

- **Zig-Zag Pavement Markings.** A technique to increase driver awareness as they approach a pedestrian or bicycle crossing is the use of Zig-Zag pavement markings in advance of pedestrian or trails crossing. They have been found to:
  - Heightened the awareness of approaching motorists,
  - Reduced mean vehicle speeds within the marking zones,
  - Changed driving behavior, and
  - Increased the tendency to yield.



## Appendix B | Pedestrian and Bicycle Best Practices

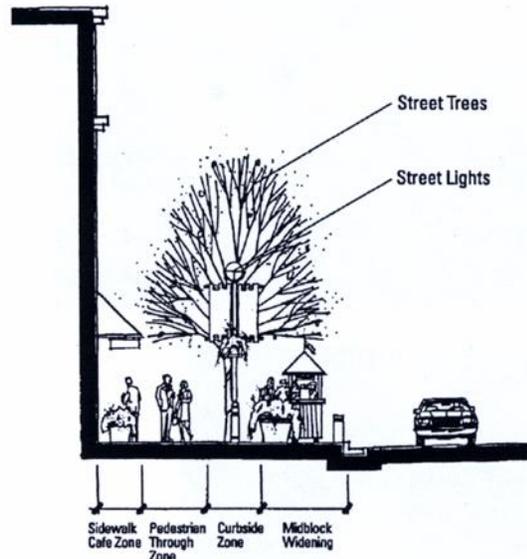


The uniqueness of the of the Zig-Zag pavement markings is likely why they are effective. Therefore the use of these markings should be used sparingly at strategic locations.

### VISUAL INTEREST AND AMENITY

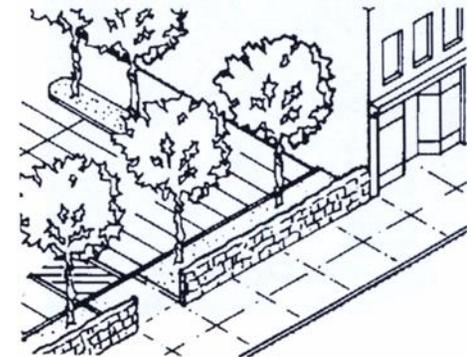
Development plans should include site amenities that enhance safety and convenience and promote walking or bicycling as an alternative means of transportation. Well-designed walking environments are enhanced by urban design elements, street furniture, and landscaping.

- Pedestrian Facilities and Elements.** Pedestrian scale improvements should fit the urban context of the area. The color, materials, and form of pedestrian facilities and features should be appropriate to the area where it is located, as well as to the functional unity of the pedestrian network. Develop attractive



improvements including landscaping, vertical treatments, sidewalk widenings, and furnishing which improve the character and pedestrian scale of the urban environment. Special design features, public art and site details enhance the pedestrian scale of streets and become an urban amenity.

- Lighting.** Standardized lighting improvements can enhance the character of the pedestrian environment. Consider the following criteria:
  - Varied light spacing and heights to be compatible with site specific issues;
  - Poles to incorporate pedestrian scale features such as banners, potted plants, etc.; and
  - Attractive luminaries to provide an organized and unified appearance throughout the pedestrian network.
- Landscaping.** The careful use of landscaping along a street can provide separation between motorists and pedestrians, reduce the visual width of the roadway (which can help to reduce vehicle speeds), and provide a more pleasant street environment for pedestrians and bicyclists. Consider the following criteria in order to provide attractive landscaping:



- Develop a continuous edge of deciduous canopy street trees on both sides of the street. Select species that provide shade, shelter, and scale for the sidewalk/pedestrian environment, and continuity for the pedestrian/ sidewalk environment.
  - Develop attractive landscaping by considering the following criteria:

## Appendix B | Pedestrian and Bicycle Best Practices

- Reduce clutter of little plants and disorganized planting;
- Establish patterns/spacing of street trees to provide a formal visual rhythm, linear edge, and organization of the sidewalk area;
- Use trees of similar height and structure to provide a unified image and cohesive character for feature corridors and districts;
- Use specialty-landscaping themes to help distinguish districts; and
- Use landscaping selectively to soften the harsh appearance of some buildings and parking lots at sidewalk edge.

### - **Urban Open Spaces.**

Attractive urban open spaces with a distinctive and definite shape, enclosed by buildings on 2-3 sides so it feels like an “outdoor room,” are favored by pedestrians. To be useful, these urban open spaces should be located at intersections of two or more pedestrian routes.



- **Retaining/Building Walls.** Retaining walls should be of materials, which reduce their apparent scale, like brick or stone, or treated architecturally to create an appropriate scale and rhythm. Hanging or climbing vegetation can soften the appearance of retaining walls. High retaining walls should be terraced down and include landscaped setbacks. Blank building walls and retaining walls should be screened with landscaping, architectural features, or art to enrich the pedestrian environment.

- **Buildings.** Outdoor cafes and activity areas that provide pedestrian character and human scale to the sidewalk environment should be encouraged.

Windows and other openings should relieve blank walls, adding visual interest, improving pedestrians’ sense of security, and introducing a human scale to building frontages. Appropriate building design and details should be used to provide human scale character to the street. Incorporate building entry details like porches and recesses, occupied spaces like bay windows and balconies.

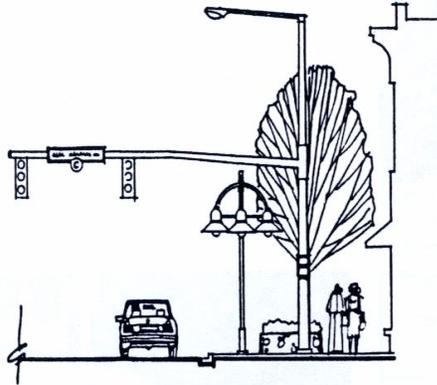


## SECURITY

Development plans should include site amenities that enhance safety and convenience and promote walking or bicycling as alternative means of transportation. Secure pedestrian settings should be provided by developing a well-lit, inhabited pedestrian network and by mitigating the impacts of vehicles.

- **Human Activity.** Streets should appear inhabited to the greatest extent possible. New development should accommodate human activity by providing balconies, terraces, and yards for residents’ use and interaction. In mixed-use buildings, retail elements like large windows, canopies, and integrated signage add activity by enhancing the shopping experience. Entrances, porches, balconies, decks, and seating should be located to promote pedestrian use of the street edge by providing weather protection, security, and safety.
- **Sight Lines.** Clear and direct lines of sight in pedestrian settings should be provided to increase feelings of security. Minimize the use of shrubs, walls, berms, and other vertical features, which screen lines of sight to pedestrian facilities to achieve clear and direct lines of sight.

- **Lighting.** General illumination should be provided for security and visual safety of pedestrian areas and corridors. Use lighting fixtures to identify and highlight key pedestrian facilities and elements such as pedestrian intersections, paths, sidewalks, and entrances, while



enhancing safety, and security. Provide a desirable and safe pedestrian environment by decreasing glare associated with tall, high intensity street fixtures. Provide indirect light to the sidewalk by lighting elements in the street environment such as trees, walkways, canopies, and entryways. Avoid over-illumination of pedestrian areas, since these create, by contrast, shadowy areas nearby which may be threatening to pedestrians.

- **Buffers.** Develop physical buffers/edges between sidewalks and streets/parking lots.

### Bicycle Facilities

Bicycles are a viable and popular form of transportation. Some bike routes have been signed and shared use paths are established in some parks, in an extensive greenway system, and in some private developments. The safety of bicycle travel is enhanced by the proper design and location of bicycle facilities. Well-developed shared use facilities are an increasingly important part of the transportation and recreation system.

The term “AASHTO Guide,” as used in this Chapter, refers to the “Guide for the Development of Bicycle Facilities,” American Association of State Highway and Transportation Officials, 1999.

### Bikeways

Developers are encouraged to include bikeways in developments. Bikeways should be indicated on site plans and preliminary plats. Existing and future bike lanes and paths within proximity of the development should be identified, along with a description of how the resident or business would safely access these facilities. It is the responsibility of the developer to conform to the standards in this chapter and the requirements for traffic control devices in the Manual for Uniform Traffic Control Devices.

While bicyclists can ride on any City street, a system of designated bicycle paths, routes, and lanes exists to identify those roads that are best suited for bicycles. The American Association of State Highway Officials (AASHTO) guidelines for bikeway design delineate three different types of bikeway facilities.

- **Bicycle Paths** include separated pathways along major arterials and portions of the multi-use trail system. While these facilities provide the safety of a separated facility, intersections with roadways and the multiple crossing of driveways and entrances provides the potential for conflict with motor vehicles, and increases the likelihood of accidents. Also, the presence of pedestrians and equestrians on trails increases the likelihood of conflicts with bicyclists. Bicycle paths require a minimum 10-foot width with two feet clear on either side of the trail.

- **Bicycle Lanes** are portions of streets that are dedicated to the exclusive use of bicycles and are usually marked with white lanes on the pavement. Bicycle lanes are located on streets that have sufficient width and high bicycle traffic. The dedicated lane decreases



the chance of one mode being slowed by the other and provides a clear lane for the bicyclist. Bike lanes do, however, restrict the cyclist to a relatively narrow section of the roadway and channels them to the far right of through traffic, posing a potential hazard for turning movements of both bicyclists and motor vehicles. Standard bicycle lane widths should be six feet;

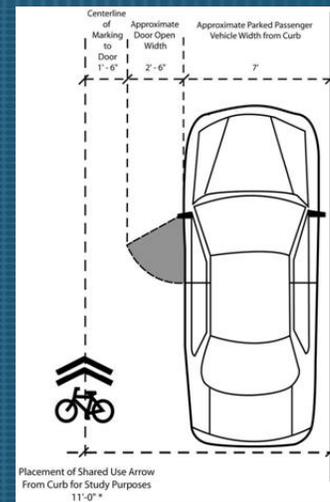
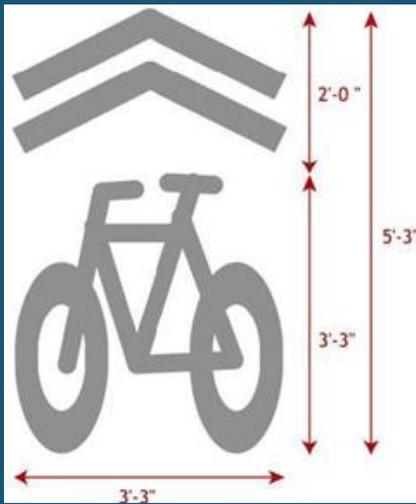
## Appendix B | Pedestrian and Bicycle Best Practices

five feet is the minimum width adjacent to curbs and four feet is the minimum width when no curb exists.

- **On-Street Bicycle Routes/Wide Shoulders** are streets or segments of streets that bicyclists share with motor vehicles. In general, designated routes have lower traffic volumes and are sufficiently wide for drivers and bicyclists to share. Most routes are located on secondary or minor streets that parallel busier,

major routes. Many of the routes are marked with special signs. Numerous commuting bicyclists prefer on-street, non-striped routes where room is provided on the outside travel lane for both cyclist and motor vehicles, but the cyclist is not restricted to one part of the roadway or another. Bicycle routes require a 14-foot outside travel lane, wide shoulder, or the ability to share the lane (local residential streets).

### Shared Lane Use Designation “Sharrow”



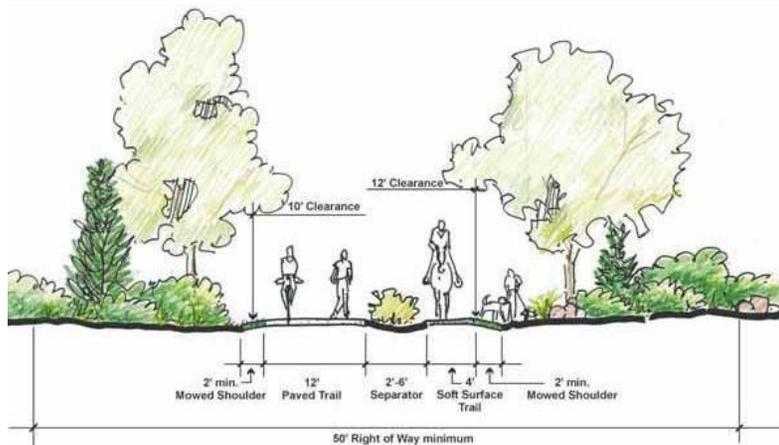
Sharrows are becoming a popular form of striping bike routes on lower volume roadways that are to be shared by automobile and bicyclist and are proposed on bike routes in Champaign. Benefits of Sharrows include:

- Encouraged motorists to be more aware of bicycles.
- Increased the distance between bicyclists and parked cars.
- Increased the distance between bicyclists and passing vehicles.
- Reduced the number of sidewalk riders.
- Significantly reduced the number of wrong-way riders.

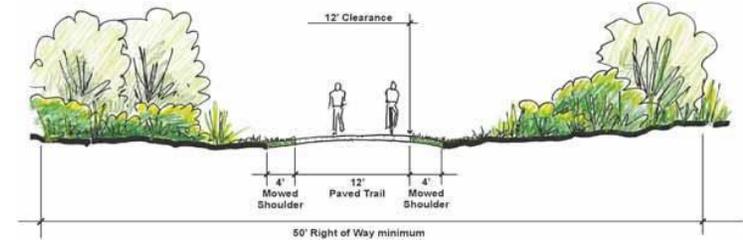
## Off-Street Bikeways

Off-street bikeways consist mostly of multi-use trails that are shared with pedestrians, horses, in-line skaters, and others. Urban trails are used primarily for recreation, but also provide an off-street transportation system for non-motorized uses. An urban trail corridor can vary from 25 to 50 feet in width. However, where feasible, a 50-foot wide corridor is found to provide adequate buffer room from other uses and a safer and more pleasant trail experience. A variety of trail designations are used throughout the area. For the purposes of the Non-Motorized Transportation System Plan, two types have been designated based on the trail tread: paved trails and unpaved trails.

- Paved Trails** often accommodate a variety of users, depending on trail width and intensity of use, as shown in the two examples below. Paved trails in high use areas accommodate a variety of trail users, including walkers, joggers, recreational bikers, commute bikers, roller bladders, and horseback riders within the same corridor. A soft shoulder on each side of the trail can be provided to separate the “wheels” from the “heels” to reduce user conflicts. The main trail tread is a single, paved trail (approximately 12'-wide). The soft shoulder consists of crushed gravel and provides a four-foot surface adjacent to or separated from the main trail head.



Where insufficient right-of-way is available to accommodate such a trail or where the intensity of use is not as high, a paved trail may consist of a single, 12-foot trail paved with concrete or asphalt. A four-foot soft shoulder on either side of the trail consists of crushed gravel or mowed grass.



- Unpaved Trails** are also multi-purpose but do not accommodate the variety of users that paved trails can accommodate. Unpaved trails are often located in the mountains or foothills and are less improved than paved trails. Unpaved trails can vary in width from four to eight feet and are constructed with a soft surface tread (*i.e.*, native soil, crushed limestone or crushed gravel). Most users are hikers, mountain bikers, and equestrians.



## Appendix B | Pedestrian and Bicycle Best Practices

### INNOVATIVE BICYCLE LANE AND PATH TREATMENTS

Evidence is increasing that bicyclist safety improves as more bicyclists are part of the traffic stream. Some innovative techniques for accommodating bicyclists on area roadways are described below.

- **Wide Curb Lane/Wide Outside Lanes.** A wide curb lane is the lane nearest the curb that is wider than a standard lane and provides extra space so that the lane may be shared by motor vehicles and bicyclists. A desirable width is 14 feet, not including the gutter pan area. Wide curb lanes are sometimes designed when right-of-way constraints preclude the installation of “full width” bike lanes.



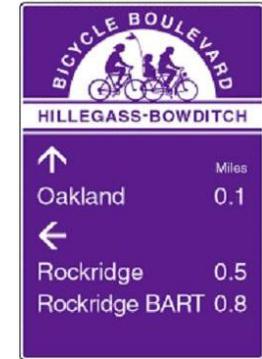
- **Contra Flow Bike Lanes.** Bicyclists are expected to follow established rules-of-the-road like riding in the same direction as motor vehicle traffic. However, in certain situations placement of a bicycle lane counter to the normal flow of traffic may increase safety or improve access for bicyclists. For example, a contra flow bike lane designated on some one-way streets may enhance connectivity and eliminate out-of-the-way detours and wrong-way riding.

- **Combination Lanes.** A combination lane usually refers to a lane nearest the curb, which serves various modes of traffic or movements. Combination lanes are generally designated for the exclusive use of buses, bicycles, and right-turning vehicles. Because bicycles generally travel at slower speeds and buses make frequent stops, these lanes can often function without impeding traffic



flow. Generally, multiple uses are operationally acceptable unless there is considerable bus and bike traffic. These combination lanes are not without problems. If there is a shortage of bus and bike traffic, the lane can become another peak hour traffic lane.

If bus and bike traffic need to be separated, the bus lane is usually nearest the curb, which reduces conflicts between buses accessing stops and bicycles traveling through, and between bus passengers and bicyclists. Separated lanes should reduce conflicts associated with buses moving into and out of a single bus and bike lane.



- **Raised Bike Lane.** Raised bike lanes have a slightly raised edge to prevent motorists from driving in the lane, protecting bicyclists from fast-moving traffic.
- **Median Bike Paths.** Median bike paths are separated bikeways constructed within the medians of major arterial roads.

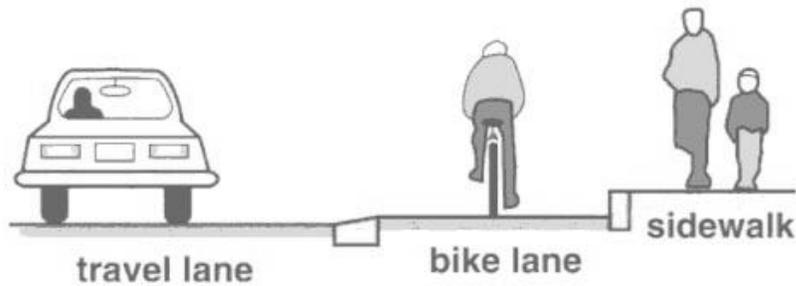


- **Bicycle Boulevard.** Bicycle boulevards are generally a single street or series of local streets that are connected to form a throughway for bicycling and walking. These boulevards often include tree canopies, occasional diverters to keep motorists from using them for direct travel, and some connectors, bridges, and other methods to provide trip continuity.

## Bicycle Networks

Establishing a vision of how bicycling fits into the overall transportation system of a community or region is important in developing a safe and enjoyable bicycle network. Identifying appropriate bicycle routes requires recognition of various user needs and abilities, and analysis of traffic operations and design factors of individual roadways.

Average bicyclists prefer to ride on neighborhood streets or designated bicycle facilities. Experienced bicyclists should be anticipated on roadways where bicycles are not excluded by statute or regulation, regardless of functional classification. Safe accommodation of all bicyclists is best accomplished by creating a comprehensive and continuous bicycle and pedestrian network in built-up areas in order to enhance the safety and travel comfort of users. General guidelines for determining the type of bikeway facility best suited to various roadway types are provided in the tables below.



A study conducted by the Federal Highway Administration (FHWA Bicycle Compatibility Index) identified several other factors that should be considered when evaluating the capability of urban and suburban roadways to accommodate both motorists and bicyclists. These factors included:

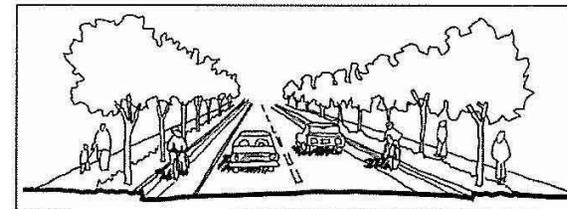
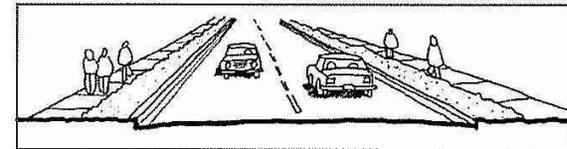
- Presence and density of on-street parking;
- Type of development or land use adjacent to the roadway;
- Large truck volume in the curb lane;
- Right-turn volumes; and
- Parking time limits.

## Techniques for Facilitating Bicycle Use

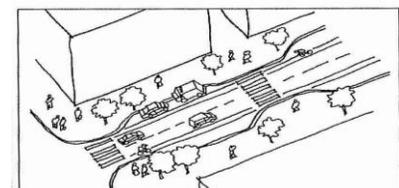
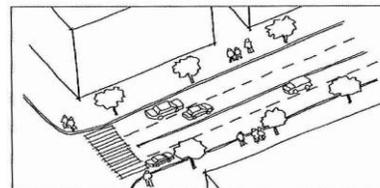
Bicycles are vehicles and need to be safely accommodated on our streets and roadways. Over half of all bicycle-motor vehicle crashes occur at or near intersections or other jurisdictions. Improvements at these locations have the potential to significantly increase safety. Specialized intersection markings that may help bicyclists and motorists safely navigate through intersections and use of innovative techniques are gaining more prominence in some communities.

### ROADWAY NARROWING

“Road diet” is a term used to describe the process of reducing the number of travel lanes on a given roadway. Road diets are often conversions of four-lane undivided roads into three lanes (two through lanes and a center turn lane). The fourth lane may be converted to bicycle lanes, sidewalks, and/or on-street parking. Road diets have been shown to improve mobility and access for all travel modes, enhance safety by reducing vehicle speeds, and to promote economic vitality for the community. A variety of reconfigurations are possible for lane number reductions depending on the current configuration, user needs, and potential operational and safety outcomes.



Before (top) and after (bottom) width of lanes is reduced.



**ROADWAY DESIGN OPTIONS FOR URBAN ROADWAYS**

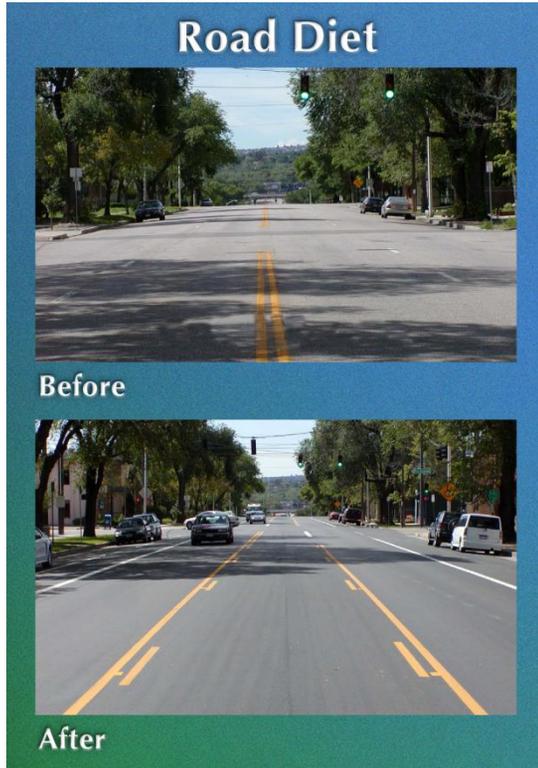
Motor Vehicle AADT/Lane		< 250 cars	250-500 cars	500-1,000 cars	1,000-2,500 cars	2,500-5,000 cars	> 5,000 cars
Peak Hour Volume/Lane		< 22 cars	22-44 cars	44-88 cars	88-220 cars	220-440 cars	> 440 cars
Avg. Peak Hour Headway/Lane		> 164 sec	164-182 sec	82-44 sec	44-16 sec	16-8 sec	< 8 sec
Average Motor Vehicle Operating Speed	0-19 mph	Shared Lane	Shared Lane	Shared Lane	Shared Lane	Shared Lane	N/A
	20-31 mph	Shared Lane	Wide Curb Lane	Wide Curb Lane	Wide Curb Lane	Bike Lane	Bike Lane
	32-43 mph	Wide Curb Lane	Bike Lane	Bike Lane	Bike Lane	Bike Lane	Bike Lane
	> 43 mph	Bike Lane	Bike Lane	Bike Lane	Bike Lane	Bike Lane	Bike Lane

**SHOULDER WIDTHS FOR RURAL ROADWAYS**

Motor Vehicle AADT/Lane		< 1,000 cars	1,000-2,500 cars	2,500-5,000 cars	> 5,000 cars
Average Motor Vehicle Operating Speed	0-30 mph	4 ft.	4 ft.	4 ft.	4 ft.
	30-36 mph	4 ft.	6 ft.	6 ft.	6 ft.
	36-43 mph	6 ft.	6 ft.	6 ft.	6 ft.
	> 43 mph	6 ft.	6 ft.	8 ft.	8 ft.

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Along with lane elimination, roadway lane narrowing may also help to reduce vehicle speeds and enhance movement and safety for pedestrians and bicyclists. Lane narrowing is best used where motor vehicle speeds are low. Lane width reduction can be achieved in several different ways:



- Lane widths can be reduced to 10 or 10.5 feet and excess pavement striped with a bicycle lane or shoulder.
- Excess land width can be reallocated to parking.
- The street and lanes can be physically narrowed by extending the curb for wider sidewalks and landscaped buffers or by adding a raised median.

### MEDIAN CROSSING ISLANDS/MID-BLOCK CROSSINGS

Median crossing islands help manage traffic, particularly left-turn movements, and reduce the number of potential conflict areas between bicyclists and motorists. Restricted access to side streets may also help to reduce cut-through traffic and calm local streets. Median crossing islands provide a refuge for bicyclists crossing a busy street at unsignalized locations where gaps in traffic are rare. The medians must be at least six feet wide to provide sufficient waiting space for bicyclists.

The objective of a mid-block crossing is to make an off-street bike path crossing safer and more visible. Various traffic calming devices exist, such as refuge islands and speed tables, which may be appropriately used at mid-block bicycle crossings. This application is appropriate at the mid-block intersection of an off-street bikeway and a street, and is suitable for streets with faster moving traffic. A bicycle logo and "XING" pavement legend are installed prior to the crossing, at a distance dependent on the roadway design speed.



### PEDESTRIAN ACTUATED RECTANGULAR RAPID FLASHING BEACON (RRFB)



One alternative to a traffic signal is the Pedestrian Actuated Rectangular Rapid Flashing Beacon (RRFB). The RRFB is a special LED flashing device installed below a crosswalk sign and placed at marked, unsignalized crosswalk locations. The RRFB increases pedestrian visibility by attracting driver attention

## Appendix B | Pedestrian and Bicycle Best Practices

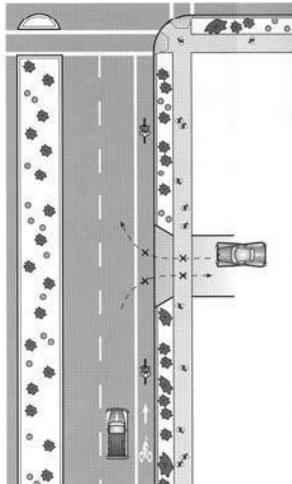
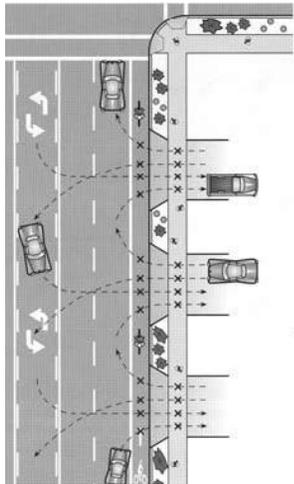
with the flashing beacons and making them aware of the pedestrian's presence.

### PEDESTRIAN HYBRID BEACON- HIGH INTENSITY ACTIVATED CROSSWALK (HAWK)

A pedestrian hybrid beacon (commonly referred to as a HAWK) uses a Yellow-Red lens configuration (two red lens on top and yellow lens on bottom) to provide a signalized, mid-block pedestrian crossing. The pedestrian hybrid beacon is used to warn and control traffic to assist pedestrians in crossing a street at a marked crosswalk. The pedestrian hybrid beacon is designed to require traffic to stop for the pedestrian walk interval (steady red) and to allow traffic movement during the flashing 'don't walk' stage of the pedestrian crossing (flashing red). The pedestrian hybrid beacon also provides flashing yellow and solid yellow warning indication to traffic that indicates the upcoming 'walk' stage/steady red.



### ACCESS MANAGEMENT/ DRIVEWAY IMPROVEMENTS



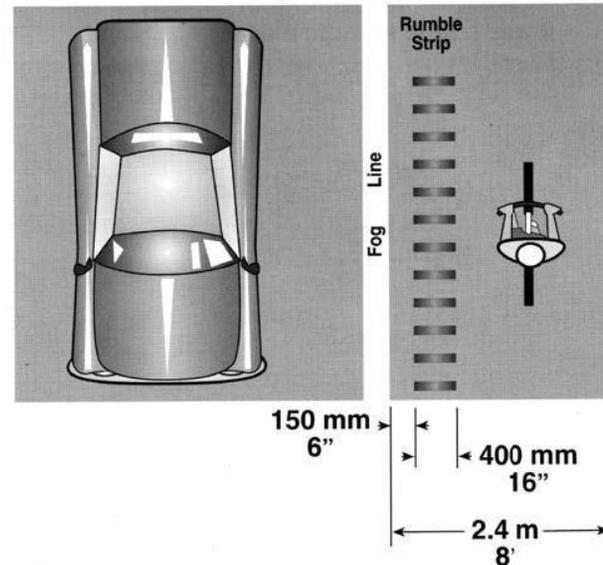
Managing the number, spacing, access, directional flow, and other aspects of driveway and side street connections protects those traveling along the roadway from conflicts with those entering/leaving the roadway.

Access management includes such measures as limiting the number or establishing minimum spacing between driveways; providing for right-in, right-out only movements; restricting turns to certain intersections; and using non-traversable medians to manage left- and U-turn movements.

Driveway design affects sight distance for both motorists and bicyclists accessing roadways, as well as the speed and care with which drivers enter or leave the roadway. Right-angle connections are best for visibility of approaching traffic, as well as slowing the turning speed for vehicles exiting or entering the roadway. Tighter turn radii at driveways, as well as ramps to sidewalk level, also slow vehicles speeds.

### PAVED SHOULDERS

The pavement edge line for the paved shoulder provides a separated space for the bicyclist much like a bike lane. Shoulders four feet wide are considered the minimum width to accommodate bicycle traffic. Experienced riders will benefit from shoulder widths as narrow as one to two feet, but these facilities should not be signed for bicyclists. Surface irregularities such as rumble strips, textured paving, and raised lane markers should be avoided on routes intended for bicyclists. Shoulder rumble strips are typically located from 0.5 to one-foot from the road edge and are typically two feet wide. AASHTO recommends that four feet of ride-able surface be present for bicyclists if rumble strips are used on a shoulder.



## Appendix B | Pedestrian and Bicycle Best Practices

### TRAFFIC CALMING

Traffic calming is a way to lower traffic speeds or volume by using physical and visual cues that induce drivers to travel at lower speeds. The design of the roadway results in the desired effect, without relying on compliance with traffic control devices such as signals and signs, and without enforcement. Traffic calming measures include the following.

- **Mini Traffic Circles.** Mini traffic circles are raised circular islands constructed in the center of residential or local street intersections. The primary benefit to bicyclists is that, like roundabouts, mini circles slow traffic approaching the intersection by forcing motorists to maneuver around them. Most impact studies suggest that mini circles have nominal impact on traffic volumes.
- **Chicanes.** Chicanes create a serpentine, horizontal shifting of the travel lanes, without reducing the number of lanes or lane width, by alternating curb extensions from one side of the roadway to the other. Shifting a travel lane has an effect on travel speeds by interrupting straight stretches of roadway and forcing vehicles to shift laterally.
- **Speed Tables.** Raised devices may provide the greatest impact of traffic calming devices on lowering speeds and may also serve to divert traffic. More gradual and/or longer humps (i.e., speed tables) are less uncomfortable for bicyclists.
- **Visual Narrowing.** Some communities have begun combining traffic calming and other techniques with treatments designed to create a visual perception of a narrow, multi-use roadway in an effort to slow speeds and increase motorist attentiveness.
- **Traffic Diversion.** Traffic diversion techniques are remedies intended primarily to reduce traffic volumes on residential neighborhood streets when traffic calming or other measures have not sufficiently reduced cut-through traffic. The prime



beneficiaries of traffic diversion are bicyclists, pedestrians, and those who live on treated streets.

- **Raised Intersections.** A raised intersection is essentially a speed table for the entire intersection. This treatment may improve intersection safety by forcing vehicles approaching the intersection to slow down and could be part of a street-wide traffic calming effort.

### ADVANCE STOP LINE/BIKE BOX

The objectives of the advance bike box are to improve the visibility of bicyclists at intersections and to enable them to correctly position themselves for turning movements during the red signal phase by allowing them to proceed to the front of the queue. A bicycle lane leading up to a bike box is located between the motor vehicle stop line and the crosswalk. The bike box should be 12 to 14 feet deep. To increase its effectiveness, a bicycle stencil should be placed in the bicycle box and a contrasting surface color is strongly recommended for the box and the approaching bicycle lane. Instructional signs and separate bicyclists signal heads can be installed in conjunction with the bicycle box.



### PAVEMENT MARKING



A variety of pavement markings are available to make bicycling safer. Generally, the markings are for lane separation, indicating an assigned path or correct position for the bicyclist, and for information about upcoming turning and crossing maneuvers. Examples of pavement marking include the striping and identification associated with bike lanes, striping for paved shoulders, turning lanes at intersections, railroad crossings, and drainage grates or other pavement hazards or irregularities. A general guideline for improved bicycle safety is to make sure the markings are durable, visible, and non-skid. Markings are usually done with paint or thermoplastic.

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Different symbols are used to indicate the presence of bicycles in the traffic stream. Some techniques to identify bicycle facilities include the following.

- **Colored Bike Lanes/Colored Shoulders.** Colored bike lanes have been a feature of bicycle infrastructure in the Netherlands, Denmark, France, and many other countries for many years. However, in the United States their use has been limited to just a handful of locations. Colored bike lanes/colored shoulders have the added effect of visually narrowing the roadway, which is shown to reduce vehicle speeds and, therefore, enhance safety for bicyclists and pedestrians.



- **Diagonally Striped Bike Lane.** A diagonally striped bike lane could be used to indicate an area of concern for bicyclists due to the opening of car doors. Diagonal arcs placed at regular intervals discourage bicyclists from riding in the “door zone.”

- **Bike Route/Shared Lane Pavement Marking.** The primary purpose of this measure is to provide positional guidance to bicyclists on roadways that are too narrow to be striped with bike lanes. Marking may be placed on the street to inform motorists about the presence of bicyclists and also to inform bicyclists how to position themselves with respect to parked cars and the travel lane.



### SIGNS



A consistent system of bicycle wayfinding signs that identify clear routes from origin to destination should be developed and implemented for use in well-defined travel ways. In addition, a sign system for off-street paths that integrates a variety of information such as maps, distances, etiquette, and regulations should be developed and implemented. A variety of

signs are available to alert motorists to the presence of bicycles in the traffic stream and to inform bicyclists.

### SIGNALS

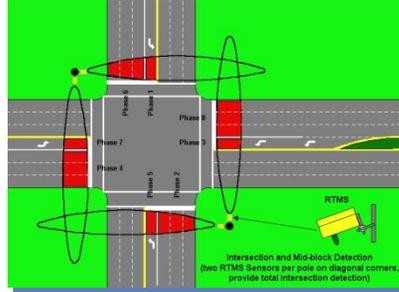
Traffic signals create gaps in traffic flow allowing bicyclists, pedestrians, and motorists to access or cross the street. Signals are particularly important for crossing higher speed roads or highly congested intersections. Besides traditional treatments such as installation of a traffic signal, innovative treatments are also being installed and evaluated throughout the country. These treatments include: separate bicycle signal heads and bicycle and pedestrian crosswalk signals, known as toucan signals.



- **Signal Timing.** Fine-tuning existing traffic detection systems may also improve bicycling conditions. Signal timing should include a minimum green time that allows bicyclists to remount their bikes and travel across the intersection, and yellow/red time that provides a safe bicycle clearance interval. Generally, two to three seconds added to the minimum automobile green time is appropriate; a yellow interval of 3.0 to 6.0 second offers sufficient time for a bicyclist to come to a complete stop or enter an intersection legally; and all red-clearance intervals greater than 2.0 seconds are needed to clear bicycles from most intersections.
- **Bicycle Signals.** A bicycle signal provides a separate signal to direct bicycle traffic through an intersection. Red, amber, and green bicycle indications are installed in addition to the standard red, amber, and green ball and arrow indications.
- **Loop Detector Stencil.** When a bicycle approaches an intersection, there are several means of detecting and facilitating its movements. Most of these innovations are passive detection devices such as loop detectors. The installation of bicycle loop detector stencils would assist bicyclists in placing their bikes appropriately on top of a loop detector so that they will be detected.

## Appendix B | Pedestrian and Bicycle Best Practices

- **Bicycle Detection Using Video Cameras.** Video systems are used to activate treatments such as signal timing specifically needed to assist bicyclists in crossing at signalized intersections. This system is useful at signalized intersections where there are dedicated bicycle lanes. The video system uses detectors drawn in video images to sense the presence of bicycles in bicycle lanes at signalized intersections.



- **Bicycle Push Button/Pad/Bar.** The bicyclist activates the signal by pushing a bar or button similar to those used for pedestrians, but the button is installed in a location convenient for bicyclists and the signal timing is set appropriately for bicyclists. The sign plate located above the push button/pad/bar indicates that it is not for the use of pedestrians. The larger the surface of the button, the easier it is for bicyclists to use.



### Support Facilities and Programs

#### PARKING AND STORAGE



Convenient and secure bicycle parking should be provided at the destination end of a trip. Inadequate bicycle parking facilities and fear of theft are major deterrents to bicycle transportation. A sufficient supply of effective bicycle parking requires a properly designed rack in an appropriate location for the type of use.

Racks should be highly visible so bicyclists can spot them immediately when they arrive from the street. A visible location also discourages theft and vandalism. Adequate lighting and surveillance is essential for the security of the bicycles and the users. Bicycle racks and lockers must be well anchored to the ground to avoid vandalism and theft.



Bicycle lockers should be provided at locations such as park and ride lots, parking garages, and employment centers.

Adequate clearance is required around racks to give bicyclists room to maneuver, and to prevent conflicts with pedestrians or parked cars. Racks should not block access to building entrances or fire hydrants.

Bicycle parking facilities should be designed in accordance with Chapter 2 of the AASHTO Guide. Bicycle parking may be provided in floor, wall, or ceiling mounted racks. Bicycle parking facilities should meet these requirements:

- Holds the bicycle frame, not just a wheel;
- Can be used with a U-shaped shackle lock;
- Accommodates a wide range of bicycle sizes, wheel sizes and types;
- Is covered with material that will not chip the paint of a bicycle that leans against it; and
- Does not have hazards, such as sharp edges.

There are many types of bicycle racks and lockers available. Some are suitable for certain situations but not others, and some designs are unsuitable anywhere. There are two general categories of bicycle parking requirements:

## Appendix B | Pedestrian and Bicycle Best Practices

**Long-Term (Class I)** parking is needed where bicycles will be left for hours at a time. It requires a high degree of security and weather protection, with well-designed racks in covered areas, lockers, storage rooms, or fenced areas with restricted access.

**Short-Term (Class II)** parking is needed where bicycles will be left for short stops. It requires a high degree of convenience (as close to destinations as possible). At least some short-term bicycle parking should be protected from the weather (a portion can be unprotected, since demand tends to increase during dry weather). This can use an existing overhang or covered walkway, a special covering, weatherproof outdoor bicycle lockers, or an indoor storage area.

The following table provides a guideline for providing parking spaces per land use category for new development or property which requires a change of use permit.



### RECOMMENDED MINIMUM BICYCLE PARKING REQUIREMENTS

Type of Establishment	Minimum Number of Bicycle Parking Spaces
Primary or Secondary School	10% of the number of students, plus 3% of the number of employees.
College or University Classrooms	6% of the number of students, plus 3% of the number of employees.
Commercial – Retail or Office	One space per 3,000 sq. ft. of commercial space or 5-10% of the number of automobile spaces.
Sport and Recreation Center	10-20% of the number of automobile spaces.
Movie Theater or Restaurant	5-10% of the number of automobile spaces.
Industrial	2-5% of the number of automobile spaces.
Multi-Unit Housing	1 space per 1-2 apartments.
Public Transit Stations	Varies, depending on usage.

## Appendix B | Pedestrian and Bicycle Best Practices

### TRANSIT ACCESS

Making transit services more bicycle-friendly can greatly expand opportunities for bicyclists. The most frequent option is an exterior rack mounted on the front of the bus that can accommodate two bicycles; however, other options exist, including interior bike racks or simply allowing bikes onboard when conditions are not crowded.

### BICYCLE PERSONAL FACILITIES

Along with secure and convenient bike parking and transit access, another prerequisite for encouraging bicycle commuting is facilities for bicyclists to shower, change clothes, or otherwise “freshen up” once they arrive at the workplace. Ideally, such facilities will be located on or very near the worksite premises and will also include lockers for storing clothing and personal items. Some creative options might be to partner with other nearby businesses to provide facilities or make arrangements with a nearby health club to allow bicyclists to use its facilities for a nominal fee.

### MAPS AND WAYFINDING

Even great bikeways can be well-kept secrets if the average rider can't find them. Although there are several bikeway maps published at a regular basis, there is a need for more comprehensive, widely available maps, especially for visitors. Some bicyclists would like to see maps that more accurately depict terrain and difficulty.

Once on a bikeway, proper signs are needed to direct bicyclists. Particularly in the case of on-street routes, bicyclists may follow Bike Route signs for a while only to find they end abruptly or don't indicate which way to go at an intersection.

On-street route signs are not just for bicyclists; they should also serve to notify motorists to watch out for bicycles. However, many of the route signs are not easy to see from a car. In addition to signs designating bicycle routes, “Share the



Road” signs directed at motorists should be placed along high traffic routes.

A well-designed bike map is typically in high demand and can serve many functions. In addition to showing the best route for getting places, bike maps often contain information or advertising for a variety of resources including a calendar of bike events, location of bike shops, points of interest in the community, laws and local ordinances pertaining to bicycles, and safety tips for the rider and motor vehicle driver. Thus, a good bike map can be a great tool for promoting bicycling, as well as for educating and informing riders and motorists.

Wayfinding pertains to direction signs, distance markers, posted maps, information kiosks, and other aides for getting people places.

### AESTHETICS/LANDSCAPING

Well-designed and well-landscaped bicycle facilities can be an important attraction, especially for the recreational bicyclist. Design of transportation facilities should incorporate the principals of Context Sensitive Design (CSD), which aims to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources while maintaining safety and mobility. Landscaping is integral to good design and is important to the overall aesthetic value of the roadway. Well-designed and landscaped facilities are also easier to maintain, lead to fewer safety and security problems, and are more likely to be supported by the neighborhoods and businesses they access.

### The 5 E's

Facilities are only one of several elements essential to building a successful bicycle and pedestrian planning transportation system. With bicycle and pedestrian safety education and training encouraging walking and bicycling, and enforcing the rules of the road as they pertain to bicyclists, pedestrians, and motorists should be combined with facilities development to form a comprehensive approach to bicycle and pedestrian use. The Colorado Guide for the Development of Local and Regional Bicycle and Pedestrian Plans identifies the 5 E's - Engineering, Education, Encouragement, Enforcement, and Evaluation – as the basis for comprehensive bicycle and pedestrian planning.

## Appendix B | Pedestrian and Bicycle Best Practices

- **Engineering.** Engineering includes facilities, maintenance, and parking. An adequate bicycle or pedestrian transportation system is one that allows users with varying abilities to safely and efficiently travel from origin to destination. Bicycle facilities include on-street facilities such as bike lanes, bike routes, low-volume roads and roads with adequate shoulders, and off-street facilities such paths, bridges, overpasses, and underpasses.
- **Education.** Education of the public is the most important element in reducing bicyclist and pedestrian injuries, reducing hostility between the various transportation modes, ensuring that the law is obeyed, and facilities are properly designed and built. Bicyclists, pedestrians, and motorists need safety education. Police officers need education regarding the manner in which to enforce bicycle and pedestrian laws, and engineers and planners need facility design education.
- **Encouragement.** Encouraging bicycling and walking can help mitigate air pollution and traffic congestion, as well as promote healthier, friendlier communities. One-way trips of five miles or less are often suitable for bicycling. Often bicyclists are willing to travel even further distances for commuting trips or recreation. Shorter trips are often suitable for walking. Providing safe, well-designed and maintained facilities encourages bicycling and walking. Annual events, such as Metro Rides Bicycle and Trails Festival, CDOT's Colorado Bike Month (June), Bike to Work Day, Colorado Pedestrian Month (October), Walk to School Day, and National Trails Day promote bicycling and walking through events and media attention. These events are designed to celebrate non-motorized transportation, encourage people to bicycle or walk, build awareness through safety campaigns in the media, and institutionalize bicycling and walking as viable modes of transportation.
- **Enforcement.** Enforcement goes hand in hand with education. Education is not effective if there is not enforcement to back it up. Therefore, it is important to enforce the rights and responsibilities of all modes of transportation by ticketing motorized and non-motorized transportation users alike. Bicyclists and pedestrians should be expected to be ticketed for traffic offenses the same as motorists.

- **Evaluation:** Evaluation involves monitoring outcomes and documenting trends through data collection before and after transportation improvements. Evaluation includes review of existing policies and standards, monitoring traffic volumes and flow, evaluating crashes, prioritization of future projects and identifying potential funding sources.

### MAINTENANCE

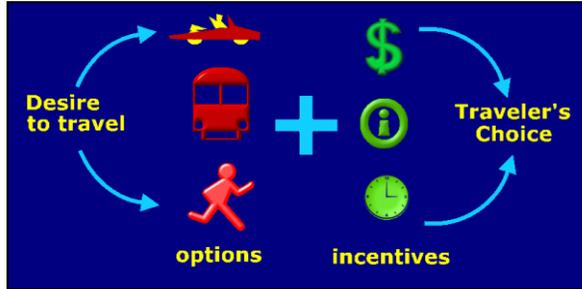
Broken glass and debris tend to accumulate near curbs where bicyclists ride, resulting in flat tires and accidents. Certain streets become mud-covered after rain, making the riding surface hazardous, while others are prone to icy conditions. Painted lanes delineating bike routes wear off over time and are no longer usable without proper upkeep. During the winter months, snow either gets plowed onto the right-most edge of the roadway (which forces bicyclists to ride farther left) or off the roadway and onto the sidewalks.

Consistent upkeep and maintenance of bikeways should be top priority. On-street routes need to be regularly swept of debris. Bike lane lines should be repainted at least as regularly as those on the rest of the street. Weather-related obstacles such as ice and mud cannot be eliminated, but can be minimized through good design practices. Bikeway segments that regularly have these problems should be identified and corrected when and where it is possible. It is recommended that all paths that are part of the bicycle system be paved.

### Transportation Demand Management

When cost and community or environmental impacts limit expansion of the transportation system, improving the management and utilization of the existing system becomes a primary strategy. Significant growth in residential and business development is projected for the region and will require a balance between transportation improvements and management to serve the growing number of residents, employees, and customers. Transportation Demand Management (TDM) is a general term for strategies that result in more efficient use of transportation resources.

## Appendix B | Pedestrian and Bicycle Best Practices



TDM is a set of strategies that manage the demand placed on our transportation system. These strategies or options increase people's travel choices, offering them the opportunity to choose how, when, and if they will travel by car or in some other way while increasing the efficiency of our transportation facilities. Options can include incentives for utilizing Mountain Metropolitan transit service to more innovative ideas, such as developing localized Transportation Management Organizations (TMOs), teleworking, or parking management programs. These TDM benefits include:

- Improved access to site and business;
- Improved mobility;
- Access to greater pool of employees;
- Improved employee retention;
- Increased parking availability;
- Tax benefits;
- Cost savings to employer; and
- Decrease congestion and air pollution.

### Transportation Demand Strategies

Transportation strategies include travel options and/or implementation steps developers, employers, employees, and residents can choose from to customize programs that fit their specific needs. Integration of various elements is the key to creating and maintaining a successful program. Flexibility is essential to the longevity and long-term effectiveness of the City's TDM program.

Metro Rides (formerly Ridefinders) is the local resource for transportation demand management. Metro Rides has been providing TDM services and advocacy since 1994. Metro Rides is minimally funded through CMAQ grants and has limited the level of projects that staff has been able to provide.

TDM strategies include the following.

### EFFICIENCY PROGRAMS

- **Compressed Work Week** – allows employees to receive a day off each week in exchange for working longer hours on other days each week.
- **Flexible Working Hours** – allows employees to alter their arrival and departure times slightly to accommodate commuting schedules.
- **Staggered Work Hours** – allows employees to regularly arrive and leave at times which can vary from as little as 15 minutes to as much as two hours.
- **Telework Policies** – develops specific personnel policies that permit and encourage the use of teleworking at least twice per month.
- **Marketing Strategies**
- **Bicycle Riders Guide** – a guide for your worksite that includes bike routes, locker and rack locations, and other pertinent information.

### MARKETING STRATEGIES

- **Bike to Work Week** – this regional promotion provides commuters with the incentive to try commuting to work by bicycle for a week.
- **Bus Riders Guide** – includes information on how to read a bus schedule, where to wait for the bus, and how to use the “bikes-on-busses” program.
- **Employee Orientation** – orientation meetings provide new employees with the opportunity to learn more about travel to and from their worksite.
- **Employee Transportation Coordinator** – this is an individual assigned the responsibility of helping employees with their commute to and from work.

## Appendix B | Pedestrian and Bicycle Best Practices

- **Special Events** – special promotions and events sponsored by the worksite to encourage the use of transportation options for the entire site.
- **Travel Options Marketing** – provides brochures, maps, and other information to commuters either individually or in an information center.

### INCENTIVES STRATEGIES

- **Bicycle Loan Program** – provides a set of bicycles (to be tracked and maintained by the employer/building owner) for general employee use.
- **Car/Bike Sharing** – cars/bikes that are available for limited short trips by either members of the car/bicycle share program, or for a per-use fee.
- **Commuter Club** – a program similar to “airline miles” by providing points or cash incentives to commuters who use transportation options.
- **Free Bike Accessories** – headlamps and helmets, can improve the safety of bicyclists, and serve to encourage greater use of bicycle commuting.
- **Bus Passes** – provide an incentive for “first time” users to try utilizing transit services to commute to work.
- **Guaranteed Ride Home** – provides a free taxi ride home to those employees who fall ill, have an emergency, or are left stranded at work.
- **Taxation Incentives** – are the federal, state, regional, and local tax rules that offer tax savings for both employees and employers.
- **Transportation Allowance** – provides a fixed allowance per month to be used for whatever mode of travel they choose, including parking spaces.

- **Vanpool Empty Seat Subsidy** – ensures that as vanpools lose riders over time, the other riders maintain a consistent user’s fee.
- **Vanpool Subsidies** – provide financial support to vanpool riders as an incentive to participate in a vanpool.

### FACILITIES AND DESIGN

- **Bicycle Racks / Lockers** – provided to commuters to secure their bicycles once they have reached their employment site.
- **Bicycle Station** – a dedicated space that provides secure and covered parking for bicycles, as well as facilities for bicyclists to shower and change.
- **Commuter Store** – a dedicated storefront that provides a location for obtaining commuter information, travel services, pass sales, etc.
- **Onsite Amenities** – provide retail and services, such as a cafe or dry cleaners, to employees at the worksite.
- **Protected Walk / Bike Corridors** – separate walking / bike traffic from parking spaces onsite, through separated paths, and landscaping.
- **Showers and Clothes Lockers** – allows for those who wish to walk or bicycle to work to “freshen up” after getting to work.
- **Traveler Friendly Site Design** – a comprehensive design that features bicycle and walking amenities, bus stop accessibility, passenger loading zones, and other design strategies.

### MANAGEMENT AND PARKING STRATEGIES

- **Clustered Parking** – parking spaces are limited and built in clusters, providing more space and paths for pedestrians.
- **Incidental Use Parking** – spaces dedicated for use by an occasional driver, such as a transit rider who must drive to work on occasion.

## Appendix B | Pedestrian and Bicycle Best Practices

- **Parking Cash Out** – provides employees with a choice: receive a parking space or receive the cash equivalent of the space.
- **Parking Charges** – can be set for cost recovery to the employer or developer, or, be variable based upon time of day and length of parking.
- **Parking Management** – balances the number of parking spaces relative to the availability of transit and other services.
- **Preferential Parking** – provides designated parking spaces for carpoolers and vanpoolers near the front entrances.
- **Unbundled Parking Leases** – spaces are not part of the office lease, with flexibility for the tenant to vary the number of parking spaces rented.

### Transportation Management Organizations

Besides implementing strategies from the tool kit of options listed above, the development and implementation of TMOs can improve access to employment and retail centers, while reducing traffic congestion and resulting pollution. TMOs are often structured as membership organizations formed to provide flexibility and a forum for employers, developers, building owners, residents, government representatives, and others to work together to establish policies, programs, and services to address their district's particular transportation issues. Typically, private business associations (they are often initiated by Chambers of Commerce), business associations, developers, or businesses as an economic tool, as well as to address congestion issues. TMOs can be self-supporting and advocate for their region's transportation needs.

TDM strategies that can be conducted by the TMOs include, but are not limited to:

- Transportation Center / Commuter Store (where transit passes and other commuter information can be obtained)
- Employee Transportation Coordinators
- Employee Shuttle
- Transit Passes

- Transit Shelters/Facilities
- Ridesharing for carpools
- Van Pools
- Bicycling/Walking (incl. showers, lockers, Bike Station, etc.)
- Preferential Parking for carpools and vanpools
- Unbundled Parking Leases
- Transportation Allowance
- TDM Friendly Site Design
- Promotion, Marketing and Education
- Flextime
- Telework

# Appendix C |

## Proposed Improvement Cost Estimates

### BICYCLE IMPROVEMENTS

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
High Priority	4th St SE	Magpie Dr	S Boise Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike lane Gaps/ Turn Lane on Right	\$4,400	\$11,000
	Byrd Dr	Crossroads Blvd	Frontage Rd NW	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$5,200	\$13,000
	E 1st St	S Railroad Ave	S Railroad Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,500	\$3,750
	E 1st St	N Washington Ave	Monroe Ave	Sharrow	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$12,000	\$30,000
	E 1st St	Monroe Ave	City Limit	Sharrow	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$6,300	\$15,750
	E 1st St	N Monroe Ave	S St Louis Ave	Sharrow	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$12,500	\$31,250
	E 1st St	City Limit	N St Louis Ave	Sharrow	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$7,200	\$18,000
	E 1st St	N St Louis Ave	Taylor Ave	Sharrow	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$13,400	\$33,500
	E 1st St	Taylor Ave	N Madison Ave	Sharrow	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$13,000	\$32,500
	E 7th St	Hayes Ave	Capricorn Ct	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$10,000	\$25,000
	E 7th St	Capricorn Ct	N Taylor Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$6,000	\$15,000
	E 7th St	Taylor Ave	Bridge	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$6,000	\$15,000
	E 7th St	Bridge	N Madison Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$9,400	\$23,500
	Eagle Dr	Glenda Ave	Eagle Dr	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$3,200	\$8,000
	Hahns Peak Dr	Fall River Dr	Rocky Mountain Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$21,000	\$52,500
	N Boyd Lake Ave	Mountain Lion Dr	E Eisenhower Blvd	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$4,600	\$11,500
	N Boyd Lake Ave	E 5th St	E CR20e	Both Shoulders < 5ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$84,300	\$210,750
	N Denver Ave	GW RR Xing	E 9th St	Gaps in Both Bikelanes	Bike Lane Widening, Striping & Signage	Fill In Bike Lane Gaps	\$13,500	\$33,750
	N Denver Ave	Citrine Ct	GW RR Xing	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$4,200	\$10,500
	N Garfield Ave	Lake Dr	BN RR Xing	Right Shoulder < 5ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$16,800	\$42,000
	N Garfield Ave	BN RR Xing	E 22nd St	Right Shoulder < 5ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$5,400	\$13,500
	N Garfield Ave	E 23rd St	E 25th St	Both Bikelanes < 4ft	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$13,000	\$32,500
	N Garfield Ave	E 25th St	Spruce Dr	Both Bikelanes < 4ft	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$9,200	\$23,000
	N Garfield Ave	Spruce Dr	Cedar Dr	Both Bikelanes < 4ft	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$5,100	\$12,750
	N Garfield Ave	Cedar Dr	Magnolia Dr	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$6,800	\$17,000
	N Garfield Ave	Magnolia Dr	E 29th St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$5,300	\$13,250
	N Garfield Ave	W 29th St	Unnamed	No Bike Lanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$9,600	\$24,000
	N Lincoln Ave	E 27th St	Width Change	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,700	\$4,250
	N Lincoln Ave	Width Change	E 29th St	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$3,200	\$8,000
	N Monroe Ave	E 27th St	E 29th St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$9,900	\$24,750
N Taft Ave	W 10th St	W 11th St	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$32,700	\$81,750	

## Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
High Priority	N Taft Ave	W 11th St	Taft Ct	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$16,020	\$40,050
	N Taft Ave	Taft Ct	W Loch Mount Dr/W 12th St	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$13,200	\$33,000
	N Taft Ave	W 12th St	W Eisenhower Blvd	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$40,020	\$100,050
	N Taft Ave	W Eisenhower Blvd	W 15th St	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$11,100	\$27,750
	N Taft Ave	W 15th St	Ru-art Dr	Right Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Right Bikelane	\$5,400	\$13,500
	N Taft Ave	Ru-art Dr	W Shore Dr	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$21,000	\$52,500
	N Taft Ave	W Shore Dr	W 18th St	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$8,100	\$20,250
	N Taft Ave	W 18th St	Connecticut Pl	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$18,000	\$45,000
	N Taft Ave	Connecticut Pl	W 20th St	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$20,400	\$51,000
	N Taft Ave	W 22nd St	W 25th St	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$47,400	\$118,500
	N Taft Ave	W 25th St	Abarr Dr	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$11,400	\$28,500
	N Taft Ave	Abarr Dr	W 28th St	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$57,900	\$144,750
	N Taft Ave	W 40th St	W 41st St	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$3,900	\$9,750
	N Van Buren Ave	Cimmeron Dr	W Eisenhower Blvd	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$2,400	\$6,000
	N Van Buren Ave	W Eisenhower Blvd	W 15th St	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$900	\$2,250
	N Van Buren Ave	W 15th St	W 17th St	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,700	\$4,250
	N Wilson Ave	W 1st St	Service Center Entrance	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$3,200	\$8,000
	N Wilson Ave	W 8th St	Sopris Cir	No Bike Lanes	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$26,100	\$65,250
	N Wilson Ave	Sopris Cir	W Eisenhower Blvd	No Bike Lanes	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$17,580	\$43,950
	N Wilson Ave	W Eisenhower Blvd	W 17th St	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$2,300	\$5,750
	N Wilson Ave	W 17th St	W 18th St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lanes	\$4,300	\$10,750
	N Wilson Ave	W 18th St	Fountain Dr	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lanes	\$4,200	\$10,500
	N Wilson Ave	Fountain Dr	Idaho Pl	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$1,600	\$4,000
	N Wilson Ave	Idaho Pl	Farisita Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$1,600	\$4,000
	N Wilson Ave	Farisita Dr	W 22nd St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lanes	\$4,200	\$10,500
	N Wilson Ave	W 22nd St	Kiowa Dr	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$2,800	\$7,000
N Wilson Ave	Kiowa Dr	Fraser Dr	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lanes	\$4,600	\$11,500	

# Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
High Priority	N Wilson Ave	Fraser Dr	Indian Hills Dr	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lanes	\$3,800	\$9,500
	N Wilson Ave	Indian Hills Dr	Arbor Dr	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$3,500	\$8,750
	N Wilson Ave	Arbor Dr	W 28th St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lanes	\$4,000	\$10,000
	N Wilson Ave	W 28th St	W 29th St	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$3,700	\$9,250
	N Wilson Ave	Tabernash Dr	W 35th St	Access signage for recreation trail	Wayfinding Signage	Wayfinding Signage	\$5	\$10
	S Boise Ave	4th St SE	E 1st St	Gaps in Left Bikelane	Bike Lane Widening, Striping & Signage	Fill In Bike Lane Gaps	\$1,200	\$3,000
	S Wilson Ave	Jill Dr	Carlisle Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$2,600	\$6,500
	W 1st St	Tacanecy Dr	S Wilson Ave	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$3,800	\$9,500
	W 1st St	S Wilson Ave	Mary Beth Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$7,000	\$17,500
	W 1st St	Mary Beth Dr	Lu Ann Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill in Bike Lane Gap at Turn Lane	\$3,900	\$9,750
	W 1st St	Lu Ann Dr	Lily Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$4,100	\$10,250
	W 1st St	N Grant Ave	N Garfield Ave	Gaps in Right Bikelane	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$3,000	\$7,500
	W 1st St	N Garfield Ave	N Railroad Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gaps/ Turn Lane on Left	\$2,300	\$5,750
	W 22nd St	Hillrose Ct	N Wilson Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap/ Turn Lane	\$2,200	\$5,500
	W 22nd St	N Wilson Ave	Firstview Dr	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill in Bike Lane Gap/ Turn Lane	\$4,000	\$10,000
	W 29th St	N Taft Ave	Aspen Dr	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$16,800	\$42,000
	W 29th St	Custer Dr	Logan Dr	Right Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Right Bikelane	\$2,700	\$6,750
	W 29th St	Lakecrest Pl	Magnolia Dr	Right Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Right Bikelane	\$11,100	\$27,750
	W 29th St	Magnolia Dr	N Garfield Ave	Right Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Right Bikelane	\$10,200	\$25,500
	W 37th St	Boulder Dr	N Taft Ave	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$9,900	\$24,750
	W 37th St	N Taft Ave	Ash Ave	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$2,100	\$5,250
	W 37th St	Ash Ave	Banyan Ct	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$34,800	\$87,000
	W 37th St	Banyan Ct	Chestnut Ct	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$15,000	\$37,500
	W 37th St	Chestnut Ct	N Duffield Ave	Right Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Right Bikelane	\$7,200	\$18,000
W 37th St	N Duffield Ave	Conifer Dr	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$42,000	\$105,000	
W 37th St	Conifer Dr	Logan Ave	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$15,600	\$39,000	

# Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
High Priority	W 37th St	Logan Ave	N Colorado Ave	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$8,100	\$20,250
	W 37th St	N Colorado Ave	N Colorado Ave	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$11,100	\$27,750
	W 37th St	N Colorado Ave	Franklin Ave	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$14,100	\$35,250
	W 37th St	Franklin Ave	Sheridan Ave	Left Bikelane < 4ft	Bike Lane Widening, Striping & Signage	Widen Left Bikelane	\$6,300	\$15,750
	W 37th St	Sheridan Ave	Butternut Ave	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$15,600	\$39,000
	W 37th St	BN RR Xing	N Grant Ave	Both Bikelanes < 4ft	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$36,000	\$90,000
	W 43rd St	Glen Isle Dr	Georgetown Dr	Access signage for recreation trail	Wayfinding Signage	Wayfinding Signage	\$5	\$10
<b>Total High Priority</b>							<b>\$1,015,430</b>	<b>\$2,538,570</b>

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Medium Priority	14th St SW	Width Change	S Wilson Ave	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,800	\$4,500
	14th St SW	S Wilson Ave	Susan Dr	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,900	\$4,750
	14th St SW	Susan Dr	Susan Dr	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$4,500	\$11,250
	Commuter Trail along Arkins RR	N Wilson Ave	Van Buren Ave	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$44,500	\$89,000
	Commuter Trail along Arkins RR	Van Buren Ave	N Taft Ave	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$51,250	\$102,500
	Commuter Trail along Arkins RR	N Taft Ave	N Garfield Ave	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$136,250	\$272,500
	Commuter Trail along Arkins RR	N Garfield Ave	Proposed BNRR multi-use path	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$17,500	\$35,000
	Commuter Trail along BNRR	14th St SW	Recreation Trail	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$105,000	\$210,000
	Commuter Trail along BNRR	Recreation Trail	W 1st St	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$41,250	\$82,500
	Commuter Trail along BNRR	W 1st St	E Eisenhower Blvd	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$132,000	\$264,000
	Commuter Trail along BNRR	E Eisenhower Blvd	W 29th St	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$134,500	\$269,000
	Commuter Trail along BNRR	W 29th St	W 37th St	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$82,000	\$164,000
	E 5th St	Callisto Dr	N Boyd Lake Ave	Gaps in Both Bikelanes	Bike Lane Widening, Striping & Signage	Widen Both Bikelanes	\$45,000	\$112,500
	N Boise Ave	E 11th St	Canal	Bad Trail Crossing	Recreation Trail Crossing	Recreation Trail Crossing	\$15,000	\$50,000
	N Boise Ave	Arikaree Dr	Park Dr	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps/ Turn Lane on Right	\$3,000	\$7,500
	N Franklin Ave	W 66th St	W 67th St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$6,200	\$15,500
	N Franklin Ave	W 67th St	W 69th St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$12,500	\$31,250
	N Franklin Ave	W 69th St	W 71st St	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Bike Lane Striping & Signage	\$13,900	\$34,750
	N Madison Ave	E 27th St	E 29th St	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$3,100	\$7,750
	N Madison Ave	E 29th St	City Limits	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,000	\$2,500

## Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Medium Priority	N Namaqua Ave	Crestone Dr	City Limits	Right Shoulder < 5ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$90,000	\$225,000
	N Namaqua Ave	Namaqua Ct	W Eisenhower Blvd	Left Shoulder < 5ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$6,000	\$15,000
	S Dotsero Dr	14th St SW	S Del Norte Dr	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gap at Turn Lane	\$2,100	\$5,250
	S Dotsero Dr	Lily Pl	Lydia Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,300	\$3,250
	Seven Lakes Dr	N Madison Ave	Fryingpan Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,500	\$3,750
	W 57th St	N Duffield Ave	Meadowlark Trailer Park	Both Shoulders < 5ft	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$94,200	\$235,500
	W 57th St	W Apple Dr	Mckinley Ave	Gaps in Both Bikelanes	Bike Lane Widening, Striping & Signage	Bike Lane Widening, Striping & Signage	\$10,800	\$27,000
	W 57th St	Mckinley Ave	N Harrison Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$6,000	\$15,000
	W 57th St	N Harrison Ave	N Grant Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$6,000	\$15,000
	W 57th St	N Grant Ave	N Garfield Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$7,200	\$18,000
	W 57th St	N Taft Ave N/CR17	N Duffield Ave	Both Shoulders < 5ft	Shoulder Widening & Striping	Widen Both Shoulders	\$75,000	\$187,500
	W 71st St	N Franklin Ave	N Harrison Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$24,000	\$60,000
	W 8th St	Width Change	N Van Buren Ave	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$4,200	\$10,500
	W 8th St	N Van Buren Ave	Bridge	Gaps in Left Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gap at Turn Lane	\$1,700	\$4,250
W 8th St	Little Ct	E Kelly Dr	Gaps in Right Bikelane	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$1,500	\$3,750	
<b>Total Medium Priority</b>							<b>\$1,183,650</b>	<b>\$2,599,500</b>

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Low Priority	14th St SW	S CR21	Bengal Ave	Gaps in Both Bikelanes	Bike Lane Striping & Signage	Fill In Bike Lane Gaps	\$9,400	\$23,500
	Commuter Trail along BNRR	City Limits	14th St SW	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$115,000	\$230,000
	Commuter Trail along BNRR	W 37th St	W 43rd St	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$57,500	\$115,000
	Commuter Trail along BNRR	W 43rd St	W 57th St	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$135,000	\$270,000
	Commuter Trail along BNRR	W 57th St	W 71st St	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$146,250	\$292,500
	Commuter Trail along GWRR	Proposed BNRR multi-use path	Recreation Trail	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$126,250	\$252,500
	Commuter Trail along GWRR	Recreation Trail	N Denver Ave	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$100,000	\$200,000
	Commuter Trail along GWRR	N Denver Ave	N Boyd Lake Ave	Use River & RR (N/S, E/W) for multi-modal transportation	Commuter Trail	Construct Commuter Trail	\$163,750	\$327,500
<b>Total Low Priority</b>							<b>\$853,150</b>	<b>\$1,711,000</b>
<b>Total Bicycle Improvements</b>							<b>\$3,052,230</b>	<b>\$6,849,070</b>

# Appendix C | Proposed Improvement Cost Estimates

## PEDESTRIAN IMPROVEMENTS

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost		
							Low	High	
High Priority	4th St SE	City Limits	S Madison Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$19,200	\$38,400	
	4th St SE	S Madison Ave	Magpie Dr	SRTS Parent Observation	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	Albany Ave	E 6th St	E 7th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$6,750	\$13,500	
	Buchanan Ave	Linden Ct	E 29th St	Crossing to big to cross with light. Drivers watching vehicles	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	Diana Dr	18th St SW	16th St SW	SRTS Parent Observation	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	E 1st St	S Railroad Ave	S Railroad Ave	No Sidewalks in Block	Attached Sidewalk	Install New Sidewalk	\$1,950	\$3,900	
	E 1st St	S Railroad Ave	S Railroad Ave	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	E 3rd St	N Railroad Ave	N Cleveland Ave	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	E 3rd St	N Cleveland Ave	N Lincoln Ave	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	Mountain Lion Dr	Bridge	Mountain Lion Pl	Gaps in Both Bikelanes	Bike Lane Widening, Striping & Signage	Bike Lane Striping & Signage	\$31,500	\$78,750	
	Mountain Lion Dr	Bridge	Mountain Lion Pl	Gaps In Both Sidewalks	Sidewalk Both Sides	Fill in Sidewalk Gaps	\$15,750	\$31,500	
	N Denver Ave	GW RR Xing	E 9th St	Gaps In Left Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$4,200	\$8,400	
	N Garfield Ave	W 5th St	W 6th St	Safe Route to School	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	N Garfield Ave	W 6th St	W 7th St	Safe Route to School	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	N Garfield Ave	W 7th St	W 8th St	SRTS Parent Observation	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	N Railroad Ave	E 11th St	E 12th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$10,950	\$21,900	
	N Railroad Ave	E 12th St	E 13th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$13,800	\$27,600	
	N Taft Ave	W Eisenhower Blvd	W 15th St	Narrow sidewalks	Widen Sidewalk	Widen Sidewalks	\$2,590	\$5,550	
	N Taft Ave	W Shore Dr	W 18th St	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	Rocky Mountain Ave	SH 34	Foxtrail Dr	Unsafe to cross roundabouts	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	Rocky Mountain Ave	Foxtrail Dr	McWhinney Blvd	Unsafe to cross roundabouts	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	S Taft Ave	Width Change	Width Change	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$30,000	\$60,000	
	W 7th St	N Grant Ave	N Garfield Ave	SRTS Parent Observation	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	W 7th St	N Grant Ave	N Garfield Ave	Gaps in Right Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$4,800	\$9,600	
	W 7th St	N Garfield Ave	N Railroad Ave	Gaps In Both Sidewalks	Detached Sidewalk	Fill in Sidewalk Gaps	\$3,600	\$7,200	
	W 8th St	Carson Ct	Duffield Ct	No crosswalk	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	W Eisenhower Blvd	Milner Ave	N Wilson Ave	Unsafe Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	W Eisenhower Blvd	Prospect Dr	N Taft Ave	Unsafe Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
	<b>Total High Priority</b>							<b>\$945,090</b>	<b>\$1,506,300</b>

# Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Medium Priority	21st St SE	Arron Dr	CDS	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$4,200	\$8,400
	2nd St SE	N Railroad Ave	S Cleveland Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$5,400	\$10,800
	3rd St SE	S Cleveland Ave	S Lincoln Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,450	\$18,900
	3rd St SE	S Jefferson Ave	S Washington Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,900	\$19,800
	Arron Dr	21st St SE	S Arthur Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$8,100	\$16,200
	Arron Dr	S Arthur Ave	S Garfield Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$6,900	\$13,800
	Arthur Ave	W 12th St	W Eisenhower Blvd	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$13,500	\$27,000
	Byrd Dr	Earhart Rd	Boeing Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$12,600	\$25,200
	Byrd Dr	Boeing Dr	Byrd Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$30,900	\$61,800
	Carlisle Dr	S Wilson Ave	Caroline Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$4,500	\$9,000
	Carlisle Dr	Caroline Ct	Caroline Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$1,800	\$3,600
	Carlisle Dr	Caroline Ct	Cynthia Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$3,600	\$7,200
	Caroline Ct	Camellia Pl	Carlisle Dr	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,550	\$5,100
	Caroline Ct	Carlisle Dr	CDS	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,600	\$7,200
	Custer Dr	Logan Dr	W 29th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$35,250	\$70,500
	E 16th St	Cheyenne Ave	Saulsbury Ct	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,250	\$4,500
	E 1st St	Monroe Ave	City Limit	Gaps In Both Sidewalks	Meandering Sidewalk	Fill in Sidewalk Gaps	\$4,400	\$6,600
	E 22nd St	N Garfield Ave	N Lincoln Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$7,650	\$15,300
	E 5th St	End	N St Louis Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$4,500	\$9,000
	E 6th St	Pierce Ave	End	Gaps In Both Sidewalks	Meandering Sidewalk	Fill in Sidewalk Gaps	\$9,600	\$14,400
	E 6th St	N Madison Ave	Albany Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,250	\$4,500
	E 7th St	Bridge	N Madison Ave	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	E 7th St	N Madison Ave	Albany Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,100	\$4,200
	E 7th St	Albany Ave	N Boise Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$5,700	\$11,400
	E Eisenhower Blvd	Cheyenne Ave	Denver Ave	Gaps in Right Sidewalk	Meandering Sidewalk	Fill in Sidewalk Gaps	\$9,000	\$13,500
	Franklin Ave	W 4th St	W 5th St	Gaps In Both Sidewalks	Sidewalk Both Sides	Fill in Sidewalk Gaps	\$4,125	\$8,250
	Franklin Ave	W 5th St	W 6th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,600	\$19,200
	Franklin Ave	W 10th St	W 11th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,300	\$6,600
	Harlow Ln	Loch-mount Dr	Loch-mount Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$3,000	\$6,000
	Harlow Ln	Loch-mount Dr	W Eisenhower Blvd	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$15,000	\$30,000
	Mountain Ash Pl	CDS	N Garfield Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$4,950	\$9,900
	N Denver Ave	E 11th St	E 13th St	pedestrian crossing at roundabout confusing	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	N Douglas Ave	W 6th St	W 7th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$600	\$1,200
	N Garfield Ave	W 29th St	Unnamed	Gaps In Left Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$5,925	\$11,850
	N Garfield Ave	Unnamed	W 37th St	Gaps In Both Sidewalks	Meandering Sidewalk	Fill in Sidewalk Gaps	\$25,800	\$38,700
	N Garfield Ave	W 37th St	W 39th St	Gaps in Right Sidewalk	Meandering Sidewalk	Fill in Sidewalk Gaps	\$5,800	\$8,700
	N Garfield Ave	W 39th St	W 41st St	Gaps in Right Sidewalk	Sidewalk	Fill in Sidewalk Gaps	\$8,700	\$17,400
	N Garfield Ave	W 39th St	W 41st St	Gaps In Left Sidewalk	Detached Sidewalk	Fill in Sidewalk Gaps	\$3,750	\$7,500
	N Garfield Ave	W 41st St	E 42nd St	Gaps in Right Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$1,200	\$2,400
	N Garfield Ave	E 42nd St	W 43rd St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$9,900	\$19,800
N Garfield Ave	W 43rd St	W 45th St	Gaps In Both Sidewalks	Detached Sidewalk	Fill in Sidewalk Gaps	\$12,900	\$25,800	
N Garfield Ave	W 45th St	W 50th St	Gaps In Both Sidewalks	Sidewalk Both Sides	Fill in Sidewalk Gaps	\$30,000	\$60,000	
N Jefferson Ave	E 11th St	E 12th St	Gaps In Both Sidewalks	Meandering Sidewalk	Fill in Sidewalk Gaps	\$4,800	\$7,200	
N Jefferson Ave	E 12th St	E 13th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,300	\$6,600	
N Monroe Ave	E 4th St	E 5th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,300	\$6,600	
N Taft Ave	Taft Farms Pl	W 57th St	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	

# Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Medium Priority	N Taylor Ave	E 1st St	E 2nd St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$4,350	\$8,700
	S Arthur Ave	23rd St SE	Arron Dr	Gaps In Both Sidewalks	Detached Sidewalk	Fill in Sidewalk Gaps	\$3,300	\$6,600
	S Cleveland Ave	S Lincoln Ave	5th St SE	No crosswalk to park from east	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	S Lincoln Ave	S Cleveland Ave	5th St SE	No crosswalk to park from east	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	S Lincoln Ave	5th St SE	3rd St SE	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$9,450	\$18,900
	S Railroad Ave	City Limits	City Limits	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$13,650	\$27,300
	S Railroad Ave	City Limits	3rd St SE	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$11,400	\$22,800
	S Railroad Ave	3rd St SE	2nd St SE	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$8,250	\$16,500
	W 10th St	N Van Buren Ave	N Tyler Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$19,500	\$39,000
	W 12th St	N Garfield Ave	Arthur Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,450	\$18,900
	W 1st St	S Tyler Ave	S Taft Ave	Gaps in Right Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,850	\$5,700
	W 29th St	Aspen Dr	Beech Dr	Need more bike & pedestrian crossings	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	W 29th St	N Colorado Ave	Sheridan Ave	Need more bike & pedestrian crossings	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	W 29th St	Lakecrest Pl	Magnolia Dr	High school students @ AM @ Railroad Crossing that in narrow and dark	Lighting	Add lighting improvements	\$25	\$50
	W 4th St	N Railroad Ave	N Railroad Ave	Bad Pedestrian Intersection	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	W 8th St	N Colorado Ave	Franklin Ave	SRTS Parent Observation	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	W Eisenhower Blvd	W Eisenhower Blvd	N Roosevelt Ave	Gaps in Right Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,150	\$6,300
W Eisenhower Blvd	Lake Dr	Unknown St	Gaps In Left Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,750	\$7,500	
<b>Total Medium Priority</b>							<b>\$894,775</b>	<b>\$1,534,850</b>

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Low Priority	18th St SW	Diana Dr	Daphne Dr	SRTS Parent Observation	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000
	26th St SW	Mckenzie Dr	Frances Dr	No Sidewalks in Block	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,300	\$6,600
	26th St SW	Brittany Dr	S Taft Ave	No Sidewalks in Block	Attached Sidewalk	Fill in Sidewalk Gaps	\$6,000	\$12,000
	Abarr Dr	N Taft Ave	W 28th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$40,200	\$80,400
	Abeyta Ct	End	W 18th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$7,650	\$15,300
	Agate Ct	End	W 18th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$7,200	\$14,400
	Chelsea Dr	E 18th St	Chancery Dr	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$1,800	\$3,600
	Cimieron Dr	N Van Buren Ave	N Van Buren Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$19,050	\$38,100
	Des Moines Ave	E 9th St	E 11th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$20,700	\$41,400
	Des Moines Ave	E 11th St	E 13th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$24,000	\$48,000
	E 10th St	BN RR Xing	GW RR Xing	Gaps In Left Sidewalk	Attached Sidewalk	Fill in Sidewalk Gaps	\$900	\$1,800
	E 10th St	GW RR Xing	N Cleveland Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,300	\$6,600
	E 8th St	N Madison Ave	N Boise Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$3,750	\$7,500
	Earhart Rd	Pitts Dr	Lear Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$21,000	\$42,000
	Earhart Rd	Lear Dr	Lindbergh Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$17,100	\$34,200
	Earhart Rd	Lindbergh Dr	Wright Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$19,800	\$39,600
	Earhart Rd	Wright Dr	Byrd Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$40,800	\$81,600

# Appendix C | Proposed Improvement Cost Estimates

Priority	Link	From	To	Problem or Comment	Facility Type	Description	Cost	
							Low	High
Low Priority	Earhart Rd	Byrd Dr	I25 Frontage Rd NW	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$12,600	\$25,200
	Earhart Rd	CDS	Pitts Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$3,900	\$7,800
	Frances Dr	26th St SW	Helena Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$29,280	\$58,560
	Frances Dr	23rd St SW	Flora Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$26,550	\$53,100
	Frances Dr	Flora Ct	Gail Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,300	\$18,600
	Frances Dr	Gail Ct	S Taft Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$6,750	\$13,500
	Loch-mount Dr	Harlow Ln	Loch-mount Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$15,000	\$30,000
	Loch-mount Dr	Loch-mount Dr	W Eisenhower Blvd	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$11,100	\$22,200
	Longs Peak Dr	N Van Buren Ave	E Broadmoor Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$22,200	\$44,400
	Marmac Dr	N Garfield Ave	N Garfield Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$5,700	\$11,400
	Mckinley Ave	W 11th St	Mckinley Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$1,200	\$2,400
	Mckinley Ave	Mckinley Ct	W 12th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$15,750	\$31,500
	N Colorado Ave	W 5th St	W 6th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,000	\$18,000
	N Garfield Ave	Lake Dr	BN RR Xing	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$11,100	\$22,200
	N Garfield Ave	BN RR Xing	E 22nd St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$1,500	\$3,000
	N Garfield Ave	E 22nd St	E 23rd St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$15,900	\$31,800
	N Grant Ave	W 9th St	W 10th St	Gaps In Both Sidewalks	Detached Sidewalk	Fill in Sidewalk Gaps	\$5,250	\$10,500
	N Harrison Ave	Barnes Pl	W 11th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$7,800	\$15,600
	N Monroe Ave	E 8th St	E 9th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,750	\$19,500
	N Monroe Ave	GW RR Xing	E 11th St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$1,200	\$2,400
	N Monroe Ave	E 41st St	E 42nd St	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,700	\$5,400
	N Monroe Ave	Width Change	Sundisk Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$20,250	\$40,500
	N Namaqua Ave	Crestone Dr	City Limits	Gaps In Both Sidewalks	Sidewalk	Fill in Sidewalk Gaps	\$33,300	\$66,600
	N Namaqua Ave	Namaqua Ct	W Eisenhower Blvd	No Sidewalks in Block	Sidewalk	Install New Sidewalk	\$1,200	\$2,400
	N Roosevelt Ave	Barnes Pl	W 11th St	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$4,500	\$9,000
	N Wilson Ave	W 43rd St	W 43rd St	Push button near power pole	Signal Improvements	Signal Improvements	\$25,000	\$75,000
	Rossum Dr	Kelim Ct	W Eisenhower Blvd	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$7,500	\$15,000
	S Roosevelt Ave	14th St SW	Barboura Dr	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$25,200	\$50,400
	S Roosevelt Ave	Barboura Dr	City Limits	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$12,450	\$24,900
	S Roosevelt Ave	Barboura Dr	S Railroad Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$40,500	\$81,000
	S Roosevelt Ave	City Limits	City Limits	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$10,500	\$21,000
	W 11th St	Colorado Ave	Franklin Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$11,700	\$23,400
	W 11th St	Roosevelt Ave	Mckinley Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,000	\$18,000
	W 11th St	Mckinley Ave	Mckinley Ct	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$6,000	\$12,000
	W 11th St	Mckinley Ct	Harrison Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$6,900	\$13,800
	W 11th St	Harrison Ave	Grant Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,450	\$18,900
	W 11th St	Grant Ave	N Garfield Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,450	\$18,900
	W 13th St	W Eisenhower Blvd	Harrison Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,900	\$19,800
	W 57th St	Mckinley Ave	N Harrison Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,000	\$18,000
	W 57th St	N Harrison Ave	N Grant Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$9,000	\$18,000
W 57th St	N Grant Ave	N Garfield Ave	No Sidewalks in Block	Sidewalk Both Sides	Install New Sidewalk	\$10,800	\$21,600	
W 8th St	Width Change	N Van Buren Ave	No Sidewalks in Block	Attached Sidewalk	Install New Sidewalk	\$35,400	\$70,800	
W 8th St	Sheridan Ave	N Roosevelt Ave	No crosswalk	Intersection Crossing Improvements	Construct Intersection Crossing Improvements	\$50,000	\$75,000	
W 9th St	N Roosevelt Ave	Harrison Ave	Gaps In Both Sidewalks	Attached Sidewalk	Fill in Sidewalk Gaps	\$2,850	\$5,700	
Whitebark Pl	Valley Oak Dr	Boyd Lake Ave	No Sidewalks in Block	Sidewalk	Install New Sidewalk	\$21,000	\$42,000	
<b>Total Low Priority</b>							<b>\$890,930</b>	<b>\$1,756,860</b>
<b>Total Pedestrian Improvements</b>							<b>\$2,730,795</b>	<b>\$4,798,010</b>

**Appendix C | Proposed Improvement Cost Estimates**

Total Bicycle and Pedestrian Improvements	\$5,783,025	\$11,647,080
Enhanced Sidewalks	\$1,000,000	\$2,000,000
Total All Improvements	\$6,783,025	\$13,647,080